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AV Communication Review

AUDIO VISUAL

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MARCH-APRIL 1961

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Program Preferences: Their Implications for the Educational Broadcaster

MALCOLM S. MACLEAN, JR.
AND EDGAR CRANE

This is the first of two articles based on a research project carried out by the authors with a team of researchers including Donald F. Kiel, William D. Tarrant, and Lloyd W. Welden, Jr. The authors also acknowledge the contributions of the staff of Michigan State University's stations, WMSB-TV and WKAR-Radio and of the University's department of radio, TV, and film, all of whom counseled them in the early stages and later offered suggestions for the project's practical application. The National Educational Television and Radio Center and Michigan State University provided funds for the study (6, 8). *Malcolm MacLean is associate professor and Edgar Crane, assistant professor, in the Communications Research Center, College of Communication Arts, Michigan State University. Mr. MacLean also teaches in the Department of General Communication Arts.*

MUCH OF BROADCAST EDUCATIONAL TELEVISION is aimed at special interest or segmented audiences. Thus a key question for the educational broadcaster is: What kinds of people will watch what kinds of programs? The answers to this question could be of practical value. Armed with foreknowledge of his potential audiences, the educational broadcaster is in a favorable position to make his publicity efforts more effective. His program director will also be better equipped to schedule programs at times when potential audiences are most likely available.

With the purpose of learning something about audience preferences, the authors conducted a study of responses to two sets of NET programs, several of the major findings of which are reported in this paper. (The NET programs are educational television programs produced

under the sponsorship of the National Educational Television and Radio Center and distributed to TV stations nationwide.)

Purpose

The general question stated earlier—What kinds of people will watch what kinds of programs?—was developed into these more specific ones:

From the responses of a more-or-less representative sample of urban adults to a heterogeneous sample of NET programs, what factors of program appeal emerge? Which programs are grouped in their appeal to one part of the audience and not to another? How does one cluster of programs differ from another in content? How do the people who like one cluster of programs differ from those who don't and from those who like other clusters?

Method

Samples of Programs. Two samples of 20 programs each were selected from NETRC files. The available listings of program series were divided by subject matter, production unit, sex of performer, and format. The samples were chosen to represent as much variety along these dimensions as possible.

Samples of Persons. We listed a random sample of Lansing area households from the city directory. Husband and wife in each household were invited to participate and were offered $10 per couple to serve as subjects. Of 162 invited, 88 completed our questionnaires and came to our program viewing sessions. In general, our samples probably represent rather well the potential ETV audience for the Lansing area and possibly for many other ETV broadcast areas as well.

When the couples arrived at our viewing rooms, we separated husband and wife so that each would see a different sample of programs. Each program sample was viewed by a group of 44 persons, 22 women and 22 men. Viewing sessions were held at two different times so that we could change the order of program presentations and thus reduce possible fatigue effects.

Questions. To persons who agreed to participate, we mailed a questionnaire asking their age, years of schooling, use of the mass media, participation in "cultural" activities, what kinds of people they thought would watch ETV, what kinds of programs they thought an ETV station would provide, their own program preferences, etc. Before each viewing session they also gave us their images of education, TV,

and ETV. They filled out forms describing the programs they were about to see and asking which programs they would like to watch.

At the viewing sessions, the subjects watched the first four-minute segment of each of 20 programs.[1] During each segment, they could indicate if and when they wished to turn the program off. At the end of each segment, they made a final decision whether or not to continue watching. They also checked semantic differential adjective scales rating the performer, the subject matter, and the production quality of the program.

Following the viewing session, the subjects were given another ballot of program descriptions and, in view of the samples they had seen, were asked to check which programs they would like to watch.

Analysis. In the present report we focus on audience evaluation of the specific subject matter of the programs. Early analysis of responses to programs indicated that if a person rated subject matter of the program as "liked" or "pleasant," he was also likely to indicate he would keep watching the program (2). Two evaluative scales were used for subject matter, each offering seven steps between the polar terms: *I like it—I dislike it,* and *pleasant—irritating.* By these means an individual could give any program's subject matter an evaluative rating ranging from 2 to 14 points. A high scorer, therefore, would be saying: "I like what this program is about very much and find it very pleasant," while a low scorer would say: "I dislike very much what this program is about and find it very irritating."

On this measure, we correlated each program with every other program in the sample. A high positive correlation between two programs would mean that the persons who liked the subject matter of one program also tended to like the subject matter of the second, and those who disliked the first tended to dislike the second. Through the tables of correlation, the programs were factor-analyzed (4, 9).

If several programs have high loadings on the same factor, this means that they tend to appeal to the same people and that these people are mainly those not appealed to by programs high on other factors. We next examined the programs high on each factor to see what content characteristics they had in common and how they differed

[1] In a few programs, the first four minutes were a kind of warm-up, leading to the question of whether these segments represented a fair sample of the program. Our feeling was that four minutes, which represented the optimum length in our experimental setup, also represented the maximum time a viewer was likely to give a program before he switched channels or turned his set off. We did show a small group of subjects two samples of several programs—sometimes the first and second, sometimes the first and last—and found their responses were much the same.

from programs high on other factors. We then added up subject-matter evaluation scores for the key programs in each factor and correlated the factors themselves with many of the other measures we had taken.

Results: Program Appeals

Let's take a look at the program factors and try to interpret them. In Tables 1 and 2, the highest factor coefficient for each program is italicized. (Correlation matrices underlying the factors and tables of residuals after extraction of factors may be obtained from the senior author.)

TABLE 1—FACTORS OF NET PROGRAM APPEAL—SAMPLE I.
(PRINCIPAL AXES WITH VARIMAX ROTATION BASED ON 44 CASES)

	Factors						
Programs	*I Arts*	*II Public Affairs*	*III Self-Improvement*	*IV Science*	*V Tradition*	h^2	*% of Viewers who would "keep on" program*
1. Puberty	*.77*	.24	.07	.04	.23	.71	33
2. La Finta	*.71*	−.03	.06	.29	−.02	.59	12
3. Sculptor	*.69*	.05	−.11	.16	−.20	.56	44
4. French thru TV	*.48*	.12	.46	.08	.05	.47	21
5. Friends	*.42*	−.01	.30	.15	.25	.35	67
6. Dinosaurs	*.36*	.33	−.31	.28	.18	.45	39
7. Witness	.12	*.94*	.06	−.05	.00	.90	26
8. USSR	−.02	*.73*	.09	.20	.01	.58	39
9. Space Doctors	.01	*.50*	−.09	.20	−.11	.31	74
10. Tragedy	.25	*.44*	.42	−.08	.06	.44	53
11. Insurance	−.22	.12	*.55*	.08	−.31	.47	63
12. Guatemala	.22	−.01	*.51*	.13	−.19	.36	58
13. Education	.08	.09	*.51*	.45	.26	.54	39
14. Agriculture	.08	.20	*.44*	−.03	−.01	.24	56
15. Forceful Sentences	−.07	.22	*.40*	.10	−.31	.32	19
16. Carbon Compounds	.15	.12	.12	*.62*	−.28	.51	51
17. Rondo	.43	−.19	.14	*.60*	.03	.60	37
18. Archeology	.29	.24	−.22	*.58*	.24	.58	56
19. Prairie Towns	.00	.12	−.13	.14	*.75*	.61	44
20. Religions of Man	.09	−.11	.06	.12	*.74*	.59	53
						$S=$	
Sum of Squares	2.60	2.29	1.89	1.66	1.75	10.18	
% Common Variance	24%	22%	19%	16%	17%	100%	
% Total Variance	13%	12%	9%	8%	9%	51%	

TABLE 2—FACTORS OF NET PROGRAM APPEAL—SAMPLE II.
(PRINCIPAL AXES WITH VARIMAX ROTATION BASED ON 44 CASES)

	Factors						
Programs	*I Arts*	*II Public Affairs*	*III Self-Improvement*	*IV Science*	*V Tradition*	h^2	*% of Viewers who would "keep on" program*
1. Adler on beauty	*.79*	−.15	.06	−.05	.10	.66	17
2. French Opera	*.77*	.18	−.01	−.03	−.05	.63	26
3. American Art Today	*.74*	.10	.05	.04	.29	.65	7
4. French-TV	.57	−.28	−.13	.18	−.11	.46	17
5. Oresteia	.57	.03	.05	.09	.46	.55	17
6. Music as Language	.55	.09	.35	.06	−.08	.44	33
7. U.S. Culture	*.41*	−.17	.40	.25	.13	.44	55
8. Middle East Crisis	.18	.48	.40	.24	.05	.48	21
9. Months before Birth	.37	*−.40*	.12	.10	−.04	.32	74
10. Social Work	.01	−.14	*.72*	−.04	−.01	.54	21
11. Freedom	.09	.13	*.72*	−.09	−.07	.56	48
12. Insurance	−.06	.02	*.64*	.31	−.04	.51	55
13. U.S. Resources	.06	.21	*.60*	.28	.00	.49	33
14. How We See	.02	−.24	*.50*	.08	.17	.34	52
15. Atomic Power	−.06	.04	−.02	*.84*	−.09	.72	59
16. Telescopes	.22	.04	.08	*.84*	−.01	.76	43
17. Brookfield Zoo	−.18	−.31	.20	*.56*	.31	.58	69
18. UN at Work	−.35	−.11	.04	*.55*	.03	.44	86
19. Greek Objects	.36	.10	.30	*.43*	.33	.52	45
20. Historical Perspective	.28	−.01	.32	.04	.59	.53	5
						$S=$	
Sum of Squares	3.49	0.83	2.78	2.58	0.95	10.62	
% Common Variance	33%	8%	26%	24%	9%	100%	
% Total Variance	17%	4%	14%	13%	5%	53%	

Factor I: Arts. Notice that for both program samples, the strongest factor is represented chiefly by *art* and *music* programs. Two programs high on this factor for Program Sample I are *La Finta Giardiniera*, an operetta, and *Visits with a Sculptor*. The program with the highest coefficient (.77) on this factor, however, deals with puberty rites.[2] Strange? Not very, when you look at the actual program. Although

[2] This means that the program, *People are Taught to be Different*, was most representative of the underlying reason people grouped these programs together and has nothing to do with how well they liked it. Actually, *Sculptor* was best liked of the three and *La Finta* least.

an anthropologist introduces and narrates the program, its dominant features are music and interpretive dance. So NETRC may classify this program under "social sciences," but viewers give it an appeal classification in the arts area.[3]

For Program Sample II, we find a similar factor. There, the three top programs are Mortimer J. Adler talking on the concept of beauty in art, a talk on French opera, and a panel discussion in *American Art Today*.

Factor II: Current Public Affairs. Program Sample I shows a strong factor for programs dealing with current public affairs, perhaps more specifically with events surrounding potential world conflict. The highest coefficient (.94) for this factor—and for the whole table—is that for the program *Witness*, a discussion of the Whittaker Chambers book on the Alger Hiss case. A program on contemporary Russia was closely allied to this appeal factor. Even a program on space medicine tied in more closely with this factor than with any other.

There was little evidence for the Public Affairs factor in Program Sample II. Only one program, *Crisis in the Middle East*, emerged to suggest it. Curiously, a program intended for expectant mothers showed up at the negative pole of *Crisis;* that is, liking for *Crisis* seemed to be negatively correlated with the program for expectant mothers.

Factor III: Self-Improvement, Utility. Included in each sample was a program from the same series on insurance. In both cases, these programs tied in with others of an adult school nature. In Sample I, the program on home insurance attracted some of the same people as did a program dealing with native dresses and other artifacts shown by a woman from Guatemala. Another program in which a family showed viewers something of farms in the southern United States correlated primarily with this factor. So did programs on how to write a good sentence and problems in American education.

A somewhat similar factor in Sample II had a panel of professors discussing the future of social work in the United States, the "climate" for liberty, health insurance and pensions, individual psychology, and U. S. geography.

Factor IV: Science. Here, Program Sample I was not clear. Two science programs—one on chemistry and one on archeology—were included but so was a program dealing with the "rondo" form of music.

[3] A detailed description of the four-minute program segments may be obtained by writing to the senior author.

Program Sample II provided a factor much easier to interpret as science since it included programs on atomic power, telescopes, and animals in the Brookfield Zoo.

Factor V: Tradition. *Prairie Towns A-Boomin'* and *Beginnings of Christianity* formed a couplet in Program Sample I. In Program Sample II, Henry Steele Commager, arguing that discussion of current problems should be based more on inductive analysis, split away from the other 19 programs. Judging by this factor, orientation toward the past may be an important aspect of content appeal.

Discussion: Program Appeals

Analysis of the reactions of viewers to two different heterogeneous samples of NET programs indicated at least five factors of content appeal. (A larger sample of programs and more viewers would likely yield more factors and more subtle discrimination among factors.)

Results indicate rather clearly strong general likes and dislikes for content dealing with the fine arts—sculpture, dance, painting, opera, etc. While arts programs were among the least popular of the 40 programs studied, viewers who liked one of them tended to like the rest. Conversely, viewers who disliked one arts program tended to dislike the rest. Later, we will see other ways in which the "pro-arts" differed from the "anti-arts" group. But for now, the practical implication seems to be that there is a sizeable segment of potential viewers who will not "buy" programs on the arts. However, there is one interesting qualification: The *Rondo* program, in which violinist Henry Temianka explained and demonstrated formal aspects of music, won some of the same viewers as other arts programs but also attracted viewers who liked programs on *Carbon Compounds* and *Religious Archeology*. This may tie in with something we have observed occasionally: Professionals in science and mathematics seem to be attracted by classical instrumental music, perhaps because of its abstract formal aspects.

French Through TV (a presentation of French phrases illustrated by cartoon stick characters) was most closely allied with the Arts factor. These results suggest (1) that persons interested in the arts are likely candidates for French (and possibly other) language programs; and (2) that some persons tend to reject "languages" which are strange to them—whether artistic or verbal.

It is hard to understand why a program by a psychologist on friendship should have its highest coefficient on the Arts factor. Perhaps children acting out various situations reminded viewers of plays. A simpler explanation would be that this program and the arts programs appealed primarily to women. Actually, the *Friends* program also tied in somewhat with two other factors—Self-Improvement and Tradition.

Sample II had a program on culture and customs brought into the United States by early settlers. This related about equally to the Arts and the Self-Improvement factors. Why so? When we look at the program, we find that furniture and other cultural objects are presented and their purposes and artistic features discussed. This finding, we think, lends further support to our interpretation of why these appeal factors emerged—the liking or disliking for "art" and the concern or lack of concern with everyday household or family problems.

We have called another factor Current Public Affairs. Actually, the program content appears to deal more specifically with matters concerning Communism and international relations. In this cluster, we get *Crisis in the Middle East*, *Witness*, *USSR*, and *Space Doctors*. A program on the concept of tragedy tied in about equally with this factor and the factor of Self-Improvement. It was ostensibly a humanities program, but began with newspaper headlines on disasters and led into a discussion of differences between disaster and tragedy. In fact, "Newspaper Headlines" might be a better name for this factor since all the programs dealt with the sort of thing one typically sees in the banner headlines. Viewers apparently reacted less clearly to the scientific-medical aspects of the space medicine program than they did to its concern with top news of missiles and satellite space discoveries and, perhaps, the threats to international peace implied by this news.

"Things one ought to know to help solve everyday problems" might be a sub-title for the Self-Improvement factor. Programs here seemed to stress the practically useful. You learn to write better sentences or select suitable home insurance, or you gain insight into the problems of teaching children. You get ideas on home decoration from a program showing furnishings in the homes of early settlers, or ideas on dress design and accessories from a program on Guatemalan culture. We are not sure what programs dealing with liberty and the future of social work have to do with this group, but they did attract the same sort of viewer.

Appeal of programs in the fourth factor seemed to depend upon variation in liking for material dealing with science and nature. We would expect the people who rated these programs high to be attracted to magazines like *Popular Science*, at one level, or *Scientific American*, at another. They probably liked natural science courses in school. Among them you might find collectors of butterflies or stones.

A liking for history or some kind of orientation toward the past appeared to underlie appeal of the programs in what we have called the Tradition factor. Probably many of the programs which NETRC classifies in the humanities area would have at least some of this appeal.

Notice the percentage of co.nmon and total variance given at the bottom of the factor tables. The figure at the bottom right in each table shows that five program factors accounted for slightly more than half the total possible variation in liking for 20 programs. In both sets, the Arts factor seemed to be most strongly represented, accounting for one quarter of the common variance in Sample I and a third of it in Sample II. This rather clear delineation of the Arts factor gives us confidence that it would appear in replications of this study. The same is true for the Self-Improvement factor which accounted for about a fifth of the common variance in Sample I and a quarter of it in Sample II. Evidence for the Science factor, though not quite as strong, seems acceptable. We are least sure of the Public Affairs and Tradition factors.

Support of Other Factor Studies

Other studies have factor-analyzed responses to content. Let us examine them to compare results with ours.

Carter studied commercial television program preferences of adults in Stoughton, Wisconsin (1). Although his programs included types not found on NET, several of Carter's factors resemble those determined here.

Factor VI of the Carter study had classical music, dance, and drama as its primary program types. We expect that this would correlate highly with our own Arts factor.

Carter's Factor II gives us more confidence in our own Factor II: Public Affairs. Its top program types were political spot news, political debates, panel news interviews, government information, and local politicians.

Core program types of Factor III of the Stoughton study were religious information, religious services, and adult and child amateur talent shows. Our Tradition factor might provide a somewhat similar appeal. On the other hand, it might tie in just about as closely with Carter's Factor VIII—health information, soap opera, and religious information.

His Factor IV and our Science factor bear some resemblance. Adventure, drama, science fiction, and nature information were the top types on this factor in the Carter study.

Carter found nothing comparable to our Self-Improvement factor, though his types included home economics, health, and farm information. Nor did we find any factors in our study similar to those in Carter's dealing with sports (Factor V) and comedy (Factor IX).

Some of the factors in the Guilford-Schneidman-Zimmerman Interest Survey support the picture produced by our analysis (3). The subjects for this survey were chosen according to their preferences among 360 kinds of activities—artistic, scientific, business-political—and others which have fairly obvious counterparts in our study. Its mechanical and personal assistance factors might be related to our Self-Improvement group. We do not see any clear relation between its linguistic, outdoor, social activity, and office work categories and the NET programs we studied.

Our Public Affairs factor provides further corroboration of the social problems, war and blood, and violence factors MacLean and Hazard found in their study of women's interest in news pictures (5). It also ties in well with the public affairs group of political, economic, and war news which Nafziger, MacLean, and Engstrom found in two studies of newspaper reading (7). The MacLean and Hazard picturesque factor and our Arts factor mutually support each other. But our samples of NET programs appear to have nothing similar to the glamorous personalities in their idolatry factor, nor to the comics-sports-pictures group in the study by Nafziger and others.

These other factor-analytic studies of what people like and dislike—even though done with quite different materials and respondents—certainly give us more corroborative than contradictory evidence for the generality of the factors we obtained. They suggest, too, that larger samples of NET programs might bring out additional factors, but probably relatively few.

Practical Implications

In what ways might these results be applied?

They should *not* be used to predict audience size for any program. Audience size depends, among other things, on the competition offered from other sources (such as crying babies) or programs on non-educational channels. In a word, audience size depends to a large extent on *when* a program is scheduled.

Our research tried to eliminate such factors, since we were interested in finding out within the range of NETRC offerings only which programs are most effective. In effect we asked viewers: "If all these programs were scheduled at the same time, and if no commercial programs were available, which would you prefer?" We and NETRC were primarily interested in how more effective programs can be produced.

Our findings, nevertheless, should be useful to the program director. First, they help him achieve a balanced program schedule of varied appeal by providing him with a set of program categories based on the way his audience—not he himself—looks at life. Second, they tell him which programs, within any single category, are most popular.

Over some stations the program content changes drastically from one half-hour to the next. As each program ends it seems to say, "Goodby. That's all for you today." Other stations, however, try to program blocs of two or three related programs, hoping to hold and build their audiences. Our findings can assist stations in this latter strategy by indicating what *viewers* regard as related programs. They show, for example, that to the viewer, programs in music, theater, or sculpture are highly related. By scheduling such programs back to back, a station might obtain variety, appeal to special segments interested in only one of the three, but at the same time draw upon a number of viewers interested in all three.

Publicity for new programs should be most effective when attached to a program whose audience is similar to the one the new program hopes to reach. Our findings suggest that a plug for a program like *Witness* might best come during or immediately following a program like *USSR*, on the assumption that public affairs fans have been attracted to the latter. The publicist might also use these program appeal factors to make his mailing lists more selective. He might win more viewers in a world affairs club, say, by promoting a few

of his best public affairs programs rather than by sending the weekly program schedule.

Of course, the person who uses the appeal factors must be able to recognize in programs not found in this study, content appeals which are similar to those of the programs studied. For those who can obtain the actual programs used in this project, study of the *content* in the first four-minute segment of each program in each factor will provide a better basis for generalization to other programs.

Let us be more specific about how these findings can be used to help maximize audiences. The program director must judge which of his programs or program series have predominantly which kind of content appeal: Arts, Public Affairs, Self-Improvement, Science, or Tradition. Then, among the arts group, say, he should pick those which he believes will appeal most strongly to art fans. Further, he should discover who in his community are art lovers, and when they are most available as viewers of his programs. He should probably bloc-program the art productions at those times. And he must make his viewers aware of the scheduling of his best art programs. Where possible, he should take advantage of the social pressures in already existing groups of art and music lovers. He should follow the same procedure for programs and series in the other content areas.

Some persons will object that the aim of educational broadcasting should *not* be to provide arts programs to persons who already know and like art, but to those who neither know nor want to know it. Whether this aim can be achieved is perhaps one of the most important questions facing educational TV. Pessimists may suggest that habits of long standing, which are reinforced daily by our practice of rejecting the unknown, will be hard to overcome by a single program, or single series, on educational TV. If the job is possible, we suspect it will be accomplished most easily in steps which avoid sharp contrasts between any two adjacent programs on the schedule.

Another way of broadening viewers' horizons was suggested by the program, *People Are Taught to Be Different*. This was a program in the social sciences category on the psychology of the teen-ager, presented through modern dance. Here was a format attractive to the arts group which might have led them to appreciate a "science" content. At the same time, the program might have broadened the horizons of the "science" group. (Or both groups might have been repelled by the unusual combination of form and subject matter.)

What actually happened? Our results indicate that in this case viewers tended to make their judgments on the basis of the program's *form* rather than its content. What is exciting, however, are the possibilities suggested for varying combinations of content and form which will attempt to break down the factorial structure we have discovered by reducing the differences between persons who are interested in "art" and those interested in self-improvement or public affairs. The publicist might follow this cue. Promotions on such a program might inform the art group of other programs in science, or the science group of other programs in art.

Program producers may be most interested in examining closely which programs in each factor had the highest appeal. In Tables 1 and 2 the percent of persons who said they would keep the program tuned in indicates popularity. For example, it was much higher for *Visits with a Sculptor* than for *La Finta Giardiniera*, for *Space Doctors* than for *USSR*. We see also that *UN at Work* and *Brookfield Zoo* were better liked than *The Greeks in Action*. The production man could easily see possible negative effects in the four-minute rolling off of credits in *La Finta*. Though he might be against whiz-bang openings like that of *Space Doctors*, he might suspect from the findings here that many persons will be intrigued enough by such an opening to stay and see if the program fulfills its promise. He might be impressed, too, by the possible influence of documentary-type, natural-life presentations in the UN and zoo programs.

Summary

We had samples of adults watch and evaluate a wide variety of National Educational Television programs. Program content evaluations were correlated and factor-analyzed. Results of this analysis suggested five types of program content appeal:

1. *Arts:* Performance and discussion of painting, sculpture, dance, opera, instrumental music, drama, foreign language.

2. *Public Affairs:* Topical, front-page newspaper kinds of events, especially in the area of international relations, space age, conflict among nations, disaster.

3. *Self-Improvement:* Insurance for home and old age, how to write a good sentence, dress and home decoration, problems of education, individual liberty, social work.

4. *Science:* Chemistry, archeology, atomic power, telescopes, animals in a zoo, precise musical forms.

5. *Tradition:* Orientation toward past, interpretation of today in terms of history, pioneer expansion in the prairie states, the beginnings of Christianity.

Others who study the specific programs in each factor may develop more meaningful and useful interpretations of their common appeal. We indicated that factor-analytic studies of content appeal in commercial television programs, news pictures, activity pictures, activity descriptions, and news reading appeared to lend added support to our findings.

We suggested some practical implications of these results. The station program director may find them helpful in enlarging the station's total audience through appeals to the various segments. The producer may discover clues to production techniques within program factors which can differentially affect program popularity.

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Increasing the Audience for Educational Television

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This study was made possible by a grant from the University of Illinois, College of Journalism and Communications, made available by Dean Theodore Peterson. The author wishes to acknowledge the contribution of Charles E. Osgood, director of the Institute of Communications Research, who helped in the formulation of the problem. Dr. Parker is assistant professor in the Institute of Communications Research, University of Illinois.

AUDIENCES WHO FIND THE CONTENT of a particular program rewarding are more likely to watch later programs in the same series, or other similar programs, than viewers not so rewarded. This thesis, if verified, has considerable significance for program planning, particularly on educational television channels. The research reported in this article was designed to provide an empirical check on its validity.

The author was unable to find any study that had empirically investigated the nature and extent of effects on later audience behavior of voluntary program viewing that is presumed to be rewarded (reinforced). There are, however, several related studies that may be noted.

Carter (1) discusses the process of audience reaction in three stages which he calls selection, cathection, and reinforcement. He considers each of the first two stages as screening conditions for later stages; that is, passing through each of the earlier stages is a necessary condition for arriving at later ones. Similarly, reinforcement increases the probability of selection of later programs in the same series, although new audiences can still be added at the selection stage as a result of promotion, program listings, and various chance factors. Referring to these three stages, Carter says, "Of the three, only reinforcement

has escaped measurement as a response to mass media content" (1:212).

The proportion of people viewing one program in a series who are found in the audience of a later program in the same series can be taken as a measure of reinforcement. In learning theory terms, this assumes that some generalization has taken place, since the stimuli preceding the tuning in of the later program in the series are not identical with the stimuli associated with tuning in the original program. A question for empirical investigation is the extent to which this generalization takes place. Does the reinforcement provided by a particular program generalize only to other programs in the same series? Does it generalize to other programs of similar content; for example, to other drama productions if the original program is drama? Does it generalize sufficiently to produce an increase in audience for somewhat dissimilar programs on the same channel as the original (reinforcing) program?

Reliable answers to such questions should be helpful to program planners concerned with attracting and holding an audience for serious programs. The same generalization phenomenon should also be seen in audience behavior with respect to both commercial broadcasting and other mass media.

Some data relevant to these questions were provided by Sandage (7) who demonstrated that a promotion campaign to build audiences for four specific programs on an educational radio station resulted in an increased audience for other programs on the same station.

Learning theorists are generally agreed that the extent of generalization depends on the strength of the reinforcement and on the similarity of the new stimulus to the original (conditioned) stimulus. Hilgard says of Hull's stimulus generalization postulate, "The postulate means essentially that the more alike two stimuli are, the more nearly one can substitute for the other in arousing conditioned responses" (4:140). In an exposition of Guthrie's contiguous conditioning theory of learning, Hilgard says, "A new conditioned stimulus, not previously reinforced, may elicit a conditioned response the first time it is presented. The probability that it will do so is increased if it is similar to the conditioned stimulus which has been reinforced" (4:51). Osgood provides a clear discussion of the generalization phenomenon (6:350-52). One of the difficulties with the concept of similarity in this context is that since things can be similar on many different dimensions, no clear prediction of the extent of generalization can be made for a new stim-

ulus, even if a good measure of the strength of the original reinforcement is available. The extent of generalization needs empirical checking in each new situation.

The present study takes advantage of an opportunity to examine changes in the viewing patterns of an audience attracted to an educational television channel by a series of dramatic productions. The specific hypothesis tested is derived from the reinforcement-generalization theory cited above: That the viewing of other programs on an educational television channel will increase as a result of the reinforcement of viewing of a particular series of programs.

Method

In the fall of 1960, WILL-TV* became the first non-commercial television outlet to program the commercially produced Play of the Week series, a 39-week series of two-hour quality dramas. There was no doubt that, particularly in a university community, new viewers would be attracted to the channel by the Play of the Week series. A sample of 806 telephone numbers of the academic staff at the University of Illinois (excluding phones found not to be in service) was drawn from the University staff directory. These numbers were called during the first hour of the first program in the Play of the Week series (the play was *Medea*, starring Judith Anderson) and respondents were asked, "Are you watching the Play of the Week on Channel 12?" They were also asked, "Have you watched any part of the program *Mosaic*** on Channel 12 this week?" and "Have you watched any other programs on the same channel this week?"

A total of 585 interviews was obtained, excluding 119 no answers, 24 busy signals, 70 no television sets, and eight refusals. From these, 466 were selected for later interviewing. Subjects rejected at this stage were those who said they could not get reception on Channel 12, those who said the reception was so poor they never watched, or those who indicated they were unlikely to be found in the audience for an educational television station at any time.

Five weeks later, during the first hour of a program featuring two plays by Strindberg, these 466 telephone numbers were called again.

* WILL-TV (Channel 12, Champaign, Urbana) is the educational television station of the University of Illinois.

** *Mosaic* is a three times a week one-hour program of information about the university consisting largely of interviews with university staff or visitors.

Respondents were asked the same three questions as in the first interview and were also asked, "Have you seen any earlier programs in the Play of the Week series?" If they answered yes, they were then asked, "Has your viewing of *Mosaic* increased since you started viewing Play of the Week?" and "Has your viewing of other programs on Channel 12 increased?" Those who answered yes to this last question were further asked, "Which programs?"

A total of 391 usable interviews resulted, excluding 23 cases now volunteering that they had no television or could not get Channel 12, four disconnected telephones, five refusals or incomplete interviews, and 43 cases of busy or not answered telephones.

Results

Play of the Week was being viewed in 14.6 percent of the 806 homes of the academic staff called at the time of the first interviews. This figure can be interpreted as between 12.2 and 17.0 percent (at the 95 percent confidence level) of the homes of the academic staff, including those without television sets or who do not get good reception on the educational channel.

Out of the 391 respondents who were interviewed twice, 27.1 percent were viewing Play of the Week at the time of the first interview and 30.4

TABLE 1—PERCENTAGE OF HOMES VIEWING *PLAY OF THE WEEK* DURING FIRST INTERVIEW, COMPARED WITH PERCENTAGE VIEWING DURING SECOND INTERVIEW (100% = 391).

		Second Interview			
		No	Yes	Total	
First Interview	Yes	11.3	15.8	27.1	$X^2 = 1.66$
	No	58.3	14.6	72.9	(n.s.)
	Total	69.6	30.4	100%	

percent at the time of the second interview, as shown in Table 1. (Table 1 should be read as follows: 11.3 percent of the respondents were viewing at the time of the first interview, but not at the time of the second.) Projecting this increase onto the base sample of 806 respondents permits the conclusion that 16.3 percent of the academic staff were viewing at the time of the second interview, a slight increase which is not statistically significant.

The respondents, dropped from the sample because they were pre-

sumed non-viewers of the channel, were not entered in the "no-no" cell of the table since the chi square test of significance of changes is independent of the number of entries in that cell (5:229).

Some part of *Mosaic* was viewed during the week of the first interview in 8.9 percent of the 806 homes called. This can be interpreted at the 95 percent confidence level as between 6.9 and 10.9 percent of the academic staff. Of the 391 respondents contacted in both waves of interviews, 16.6 percent were viewing during the week of the first interview and 21.7 percent during the week of the second interview, as shown in Table 2. The increase, which is an increase from 8.9 to 11.4 percent when projected on the total population, is statistically significant.

TABLE 2—PERCENTAGE OF RESPONDENTS VIEWING *MOSAIC* DURING WEEK OF FIRST INTERVIEW COMPARED WITH PERCENTAGE VIEWING DURING WEEK OF SECOND INTERVIEW (100% = 391).

		Second Interview			
		No	Yes	Total	
First Interview	Yes	10.5	6.1	16.6	$X^2 = 3.92$
	No	67.8	15.6	83.4	($p < .05$)
	Total	78.3	21.7	100%	

At least one program on the educational television channel was viewed during the week of the first interview in 25.2 percent of the 806 homes called. This figure excludes Friday viewing since the interviews were conducted Thursday evening. The data justify the conclusion that (at the 95 percent confidence level) the educational television channel was viewed in 23.7 to 26.7 percent of the homes of the academic staff during this period. Of the respondents contacted in both waves of interviewing, 46 percent viewed something on the educational channel dur-

TABLE 3—PERCENTAGE VIEWING SOMETHING ON THE ETV CHANNEL DURING WEEK OF FIRST INTERVIEW COMPARED WITH PERCENTAGE VIEWING DURING WEEK OF SECOND INTERVIEW (100% = 391).

		Second Interview			
		No	Yes	Total	
First Interview	Yes	14.6	31.4	46.0	$X^2 = 9.92$
	No	29.4	24.6	54.0	($p < .001$)
	Total	44.0	56.0	100%	

ing the week of the first interview and 56 percent during the week of the second interview, as shown in Table 3. The increase, which is an increase from 25.2 to 30.2 percent when projected onto the total population, is statistically significant.

It was predicted that those who were rewarded (reinforced) in their viewing of Play of the Week would be more likely to increase their viewing of *Mosaic* than those not so reinforced. For this analysis, the 65 cases in the completed sample of 391 who viewed *Mosaic* during the week of the first interview had to be excluded, since no increase could be shown for those already viewing. Table 4 shows that 31.7 percent of the 41 respondents reinforced in their viewing of Play of the Week (i.e., those who were viewing Play of the Week at the time of both interviews) viewed *Mosaic* at some time during the week of the second interview. Only 16.8 percent of the 285 respondents not so reinforced viewed *Mosaic* at some time during the week of the second interview. The difference is statistically significant.

TABLE 4—PERCENTAGE VIEWING *MOSAIC* BY REINFORCEMENT IN VIEWING *PLAY OF THE WEEK*

	N	%	
Reinforced	41	31.7	$t = 2.29$
Not Reinforced	285	16.8	($p < .05$)

Table 5 presents the results of a similar analysis of those who viewed nothing on the educational channel or who viewed Play of the Week only at the time of the first interview. Of those reinforced in their Play of the Week viewing, 70 percent watched in addition some other program on the educational channel during the week of the second interview. Only 33.8 percent of the balance of the respondents viewed something other than Play of the Week during that period. The difference is highly significant statistically. The 127 respondents who viewed some-

TABLE 5—PERCENTAGE VIEWING OTHER PROGRAMS ON ETV BY REINFORCEMENT IN VIEWING *PLAY OF THE WEEK*

	N	%	
Reinforced	30	70.0	$t = 3.85$
Not Reinforced	234	33.8	($p < .001$)

thing other than Play of the Week on the educational channel during the week of the first interview were excluded from this analysis.

Additional questions were asked in the second interviews in an attempt to provide at least face validation for the claim that the increase in viewing of other programs on the educational channel was due in part to Play of the Week. Respondents who reported viewing at least one earlier program in the Play of the Week series were divided into two groups—those who were viewing Play of the Week at the time of the second interview (and had presumably been reinforced in their earlier viewing) and those who were not watching (and presumably had not been reinforced or not as strongly reinforced in their earlier viewing). Table 6 shows that 36.2 percent of the viewers and 20.9 percent of the non-viewers report an increase in viewing of *Mosaic*. The difference is statistically significant.

TABLE 6—PERCENTAGES OF *PLAY OF THE WEEK* VIEWERS AND NON-VIEWERS REPORTING AN INCREASE IN *MOSAIC* VIEWING

	N	%	
Viewers	105	36.2	$t = 2.60$
Non-Viewers	129	20.9	($p < .01$)

A similar analysis, the results of which are presented in Table 7, demonstrates that Play of the Week viewers are much more likely to report an increase in viewing of other programs on the educational television channel than non-viewers. The difference is highly significant statistically. The analyses presented in Tables 6 and 7 both excluded all cases who had never viewed Play of the Week.

TABLE 7—PERCENTAGES OF *PLAY OF THE WEEK* VIEWERS AND NON-VIEWERS REPORTING INCREASE IN OTHER ETV VIEWING

	N	%	
Viewers	105	51.9	$t = 3.25$
Non-Viewers	129	31.0	($p < .001$)

The reinforcement-generalization theory leading to the hypothesis of an increase in viewing *Mosaic* and other programs on the channel would predict that the greatest increase would result in programs most like the reinforcing program and the least increase would be found in programs least like the reinforcing program. This prediction cannot be statistically

tested with data from the present survey, but some relevant data were collected. Respondents who claimed an increase in viewing of other programs since starting to view Play of the Week were asked, "Which programs?" The most frequent response (seven mentions) was for the Friday night BBC plays, the only drama other than Play of the Week regularly scheduled on the channel. The next most frequent responses were political discussions or election returns (not surprising since the second interviews were conducted two days after the election), and programs of music (six mentions in each category). News programs received four mentions. It is interesting to note that, at the other end of the "similarity" continuum from entertaining drama, two mentions were received for sociology lectures and one for economics lectures.

Discussion

The results presented above clearly support the hypothesis that an increase in viewing of other programs on the same channel can be attributed to the repeated viewing of a series of television programs. The reinforcement-generalization hypothesis derived from learning theory to predict this finding appears to be the best explanation of these results. However, a difficulty inherent in most survey research makes it impossible to definitely rule out on the basis of present evidence one possible alternate explanation. This explanation is that the characteristics of people who find quality drama rewarding are such that they are more likely to view other programs on an educational television channel anyway. This point of view would deny that the reinforcement of drama viewing (independent variable) is a cause of other viewing on an educational channel (dependent variable). Proponents of this view would claim that some known or unknown characteristic of the people involved (independent variable) is the cause of both viewing drama on educational television (dependent variable) and other programs on education television (second dependent variable).

A promotion campaign involving both Play of the Week and other programs, but not *Mosaic* (except for inclusion in program listings), was conducted during this period. This may account for much of the general increase in viewing found on the channel. It is quite possible, in fact quite likely, that those who find quality drama rewarding are more likely to view other programs on an educational channel than those who are unmoved by good drama. But this does not account for the greater *increase* in other viewing by people so reinforced. The fact

that viewing of other programs on the educational channel increased significantly while the increase in viewing of Play of the Week was not significant supports the contention[1] that a reinforcement-generalization phenomenon is taking place.

Whatever the theoretical explanation of the phenomenon, the implications for programming are fairly clear. If one of the goals of educational television is to attract an audience interested in programs of a cultural and educational level above that which most commercial channels are willing to attempt, then a wide variety of such programs should be contemplated.

An apparently contrary conclusion is drawn by Geiger and Sokol in their recent paper on educational television in Boston. On the basis of a small negative relationship between watching television for recreation and watching for education or information, they conclude as follows: "Therefore, if an educational television station wants to attract . . . [those who are most devoted to the idea of becoming educated or informed], it will need to produce highly educational programs, whereas if it wants to reach . . . [those least interested in education and information], the limitations on eligible types of programs are much less narrow" (3:67).

Geiger and Sokol's argument is based partly on the greater selectivity of viewing among those who are interested in educational or informational materials on television. Their conclusion seems to imply that because of the greater selectivity of its potential audience, educational television should restrict itself to "highly educational programs." This conclusion does not follow from the available data, neither from the data of the present study nor from that presented by Geiger and Sokol. If most viewers of educational television are highly selective viewers, as appears to be the case, then there is certainly no disadvantage (as it would be for commercial broadcasters worried about "audience flow" in a widely varied program schedule). The additional advantage of a varied schedule attracting new audiences, some of whom are likely to view programs other than those that originally attracted them to the channel, seems to outweigh clearly the kinds of considerations raised by Geiger and Sokol.

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Tape Recorded Lectures in the College Classroom

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The author is assistant professor of education at San Francisco State College. *The research reported here was supported by a grant from the U. S. Office of Education (NDEA Title VII). An article by the author and Joseph Sadnavitch entitled "Measuring Attitudes Toward Filmed Courses" appeared in the November-December 1960 issue of this journal.*

Anticipating greatly increased college enrollments in the next several decades, educators have been forced to evaluate schemes which can economically yet effectively extend the teaching potential of college faculties. One possible solution to this problem is to allow capable instructors to reach more students through the use of mechanical agents such as motion pictures, television, or sound recordings. Although the economy of such a solution is undeniable, the educational effectiveness of certain mass media techniques has not yet been conclusively demonstrated. The experiment described in the following pages represents an attempt to assess the efficacy of one of these new techniques. The purpose of the investigation was to determine the effectiveness of teaching a graduate course with a series of tape recorded lectures.

Arguments in favor of using tape recorded lectures appear to be most defensible in situations where seriously overcrowded enrollment makes it impossible to secure qualified instructors. Faced with a choice between assigning a course to a poorly prepared professor or to a series of recorded lectures prepared by a specialist, many college administrators (and, for that matter, many students) might reasonably be expected to choose the recordings.

Even though it is evident that such a procedure makes it possible for an instructor to reach more students, it must be demonstrated that the approach will yield educational results comparable to those gained through conventional modes of instruction. The present experiment was designed to supply empirical evidence regarding this question.

Previous Research

Among the earliest reported investigation of the educational utility of sound recordings was a series of experiments conducted by Rulon and others (7, 8, 9, 10), which dealt with the value of the phonographic recording as a supplementary high school teaching device.

Research concerning the effectiveness of tape recordings in teaching has generally been conducted on the elementary or junior high level. Typical of such studies was a recent series in Nebraska (4, 6) investigating the effectiveness of tape recordings in teaching spelling and conversational Spanish. The researchers concluded that the use of tape recordings is a highly effective method at the elementary school level. Successful use of educational tape recordings with elementary and junior high school pupils has been reported by Gallacher and Stevens (3), Laube and Brentano (5), and Wendeline (12).

However, Allen's recent review (1) of research dealing with educational applications of sound recordings indicates that relatively few basic studies have been made of the effectiveness of recordings in teaching factual information. Research dealing with the use of sound recordings at the college level is notably absent.

Method

The Variables. The independent variable under consideration in this experiment was method of teaching, i.e., teaching by a conventional lecture-discussion approach versus teaching by a series of tape recorded lectures coupled with brief discussions led in person by the lecturer. The dependent variable was student achievement in a graduate course in educational research methodology. An attempt was made to assess three relatively distinct aspects of student achievement consistent with objectives established for the course.

The Measures. One aspect of student achievement considered important in the research methods course was acquisition of factual information regarding research techniques. The instrument used to assess the acquisition of this information was a test consisting of 75

multiple choice items which covered the essential content of a course in educational research.

Another type of student achievement considered important in the course was ability to make sound interpretations from reported research. A test designed to measure this type of ability consisted of 25 multiple choice items requiring interpretation, as opposed to information recall.

Since it was also considered desirable for students to develop some degree of competency in planning research studies of their own, a method was devised to assess ability to design a research study. Students were given a brief description of a problem suitable for research analysis and were instructed to describe a research plan appropriate for investigating it. The written descriptions were rated by two faculty members (other than the writer), both of whom are experienced research workers.

Since intellectual capacity was considered an important variable upon which groups should be equated, scholastic aptitude was assessed by the Miller Analogies Test[1] (MAT), an instrument designed to measure academic aptitude at the graduate level. The MAT consists of 100 verbal analogies of the standard form, A: B:: C: D. Each test item requires a recognition of the relationship between elements in the analogy.

Research Sample. Subjects for the experiment were 55 students enrolled during the 1960 summer session in an educational research course at Kansas State College of Pittsburg. This course is an institutional requirement in the sequence leading to the Master of Science degree. The writer served as the instructor in the course.

Procedure: During the first regular class meeting of the summer session, students were informed of the investigation in which they would be involved. The first two class periods were utilized for the administration of the following instruments: the information test (40 minutes), the interpretation test (25 minutes), and the research design test (25 minutes).

In addition, another class period was devoted to the administration of the MAT to all subjects who had not previously taken it. Information was also gathered from each student regarding sex, age, amount of graduate credit, amount of teaching experience, and previous credit in courses related to research methods, i.e., statistics or measurements.

[1] *Miller Analogies Test.* New York: The Psychological Corporation, 1952.

Students were assigned to two groups on the basis of the test and MAT scores and other information obtained during the first three class sessions. There were no significant differences between the groups with respect to sex, age, graduate credit, teaching experience, or previous credit in measurements or statistics courses. One of the two groups was randomly designated as the experimental section (to be taught via tape recordings) and the other was designated as the control section (to be taught in a conventional mode). The experimental and control sections included 27 and 28 students respectively. Means and standard deviations of the two sections for the three matching variables are presented in Table 1.

TABLE 1—MEANS AND STANDARD DEVIATIONS OF THE EXPERIMENTAL AND CONTROL GROUPS ON THE MILLER ANALOGIES TEST, THE INFORMATION PRE-TEST, AND THE INTERPRETATION PRE-TEST

		MAT		*Information*		*Interpretation*	
Group	*N*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*
Experimental	27	33.9	12.5	10.4	4.2	5.0	3.1
Control	28	33.9	12.5	10.5	4.7	5.0	2.6

Both groups attended class Monday through Friday, the control section from 2:10 until 3 p. m.; the experimental section from 2:30 until 3:20 p. m. Since the first 30 minutes of the experimental class consisted of a tape recorded lecture, the instructor was able to meet with the control class and, at its conclusion, with the experimental class for a 20-minute period which was used for discussion purposes. A research assistant, enrolled for credit but not included as a subject in the experiment, operated the tape recorder for the experimental class.

Lectures were usually taped several days in advance (rarely more than three) so that the sequence of course content would be comparable in both experimental and control sections. Each tape lasted approximately 30 minutes. In all, 34 taped lectures were heard by the experimental class. These lectures covered the basic content of the course in research methodology.

The same material that formed the substance of the taped lectures was treated in the control class, but in a lecture-discussion manner. In the experimental class, the discussion following the taped lectures was usually based upon the content of that particular day's lecture.

Questions which students had written out during the recorded lecture were frequently addressed to the instructor during the discussion period.

At the conclusion of the summer session, two days were devoted to testing. During these class sessions the experimental and control groups met together in one room. The tests used at the outset of the experiment were re-administered, i.e., the information test (55 minutes), the interpretation test (25 minutes), and the research design test [2] (30 minutes).

Opinions of the tape recorded lecture technique were solicited from experimental students during the last week of the summer session. To promote candor, unsigned written opinions were handed in to a student (chosen by the class) who relayed them to the instructor after the deadline for filing course grades.

Analysis. Since the two groups had been equated on variables which were considered to be positively related to the criterion measures, differences between groups were tested by a *t* test model appropriate for use with equated groups.[3] (The equating measure used in these analyses was a student's score on the MAT.) Pearson product-moment correlation coefficients were computed between the measures involved in these *t* tests. In testing for differences between the two groups on the experts' evaluation of students' performance on the research design test, the Mann-Whitney *U* Test [4] was employed. Opinions of the experimental students regarding the tape recording method were summarized.

As the first step in the data analysis, correlation coefficients were calculated for the following relationships: MAT—information post-test, MAT—interpretation post-test, information post-test—interpretation post-test, and MAT—information post-test and interpretation post-test combined. The correlation coefficients for these four relationships are presented in Table 2.

All of the correlation coefficients were statistically significant beyond the .01 level. Identical coefficients of .46 were observed between the MAT and the information test as well as between the MAT and the interpretation test. It was considered appropriate to use MAT scores as a matching variable in the particular *t* model which was to be employed for testing differences between groups.

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[2] Although the general format was the same as the pre-test, a different problem was used for the post-test version of this instrument.

[3] This technique was treated by A. L. Edwards in *Statistical Methods for the Behavioral Sciences.* New York: Rinehart, 1957. p. 282-88.

[4] Described by S. Siegel in *Nonparametric Statistics for the Behavioral Sciences.* New York: McGraw-Hill Book Co., 1956. p. 116-27.

TABLE 2—INTERCORRELATIONS OF 55 STUDENTS' SCORES ON THE MILLER ANALOGIES TESTS, INFORMATION, INTERPRETATION, AND COMBINED INFORMATION AND INTERPRETATION POST-TESTS

Measures	*r*
MAT—Information	.46
MAT—Interpretation	.46
Information—Interpretation	.41
MAT—Combined information and interpretation	.51

The correlation of .41 between the information and interpretation tests, although indicative of a statistically significant relationship, tends to indicate that these two instruments assessed characteristics which were at least to some extent different in nature (ostensibly information acquisition and interpretation ability). To provide a more comprehensive index of performance, each student's scores on the two tests were combined by simple addition. The relationship between the MAT and the combined information and interpretation tests was slightly higher than the other three, i.e., r=.51.

Differences were tested between performances of the experimental and control groups on the information post-test, the interpretation post-test, and the combined information plus interpretation tests by a *t* model in which MAT scores were employed as a matching variable. Standard deviations, means, and *t* values for these analyses are presented in Table 3.

TABLE 3—MEANS, STANDARD DEVIATIONS, AND *t* VALUES OF EXPERIMENTAL AND CONTROL GROUPS' POST-TEST PERFORMANCE ON THE INFORMATION, INTERPRETATION, AND COMBINED INFORMATION AND INTERPRETATION TESTS

	Group				
	Experimental			*Control*	
Test	*S.D.*	*Mean*	*t*	*Mean*	*S.D.*
Information	8.99	49.41	1.31	51.86	6.35
Interpretation	3.59	17.00	.20	17.18	3.56
Combined	11.45	66.41	1.12	69.04	8.24

No significant differences between the two groups were discerned on any of the three measures. The performance of the two groups was particularly similar in the case of scores on the interpretation test where a mean difference of only .18 was observed. The differences between

mean scores of the two groups on the information test was 2.45. The difference between group means for the combined tests was 2.63.

In order to test the hypothesis that students of dissimilar intellectual ability respond differently to the taped lectures, both the experimental and the control classes were divided into sub-groups. In each case, a high ability group was composed of those students who scored above the group MAT mean and a low ability group was composed of those who scored below the group MAT mean. In both sections the upper ability sub-group was composed of 12 students. In the experimental and control sections the low ability sub-group consisted of 15 and 16 subjects respectively. Differences were assessed by the Mann-Whitney *U* Test. No significant differences were observed between the experimental and the control groups either in the case of the high ability or low ability sub-groups.

Students' written responses to the research design test were rated by two experienced researchers. To eliminate bias arising from the raters' previous acquaintance with some of the students, names were removed from the responses and identification was made by a code number system. It was also impossible for the raters to determine whether the responses were made by experimental or control students. Although the raters conferred prior to the rating process in order to agree upon the criteria to be employed in a ranking scheme, each rater evaluated the papers individually. Pre- and post-test responses were rated separately.

The degree of inter-rater agreement was determined by rank order correlation coefficients for ratings of the pre-experiment designs as well as the post-experiment designs. For the pre-test, the coefficient between raters' evaluations was .86; for the post-test, .67. Both of the rank order coefficients were significant beyond the .01 level.

Differences between the quality of research plans prepared by the experimental and control groups were tested for significance by the Mann-Whitney *U* Test. The difference was not statistically significant on either the pre-experiment responses, (z=1.17) or the post-experiment responses (z=.19).

In general, student opinions of the taped lecture method were favorable. Among the advantages which students noted for the experimental approach were (1) that there were fewer distractions and interruptions during the course of a taped lecture than in an ordinary classroom lecture, (2) that the recorded lectures were better organized than in a typical class, and (3) that the relaxed atmosphere produced by the

teacher's absence was conducive to learning. On the negative side, several students pointed out (1) that the taped lectures occasionally moved too rapidly and (2) that questions which might have been asked during the course of the lecture were sometimes forgotten prior to the discussion period.

Many of the students in the experimental group indicated that the discussion period following the taped lectures was extremely important since it allowed an opportunity for clarification of lecture material.

Discussion

Since the performance of the tape-taught students was comparable to that of the conventionally taught students on all of the criterion measures considered, it must be concluded that tape recorded lectures, as they were employed in this experiment, were used effectively as a teaching technique.

This conclusion, however, should be treated with caution since the present investigation must be classified as only a pilot study. The results suggest that further research on a larger scale may demonstrate that tape recorded lectures at the college level can effectively be used to widen a faculty's teaching capacity. It is possible, however, that only certain types of course content are amenable to this approach.

The extent to which the discussion periods led by the instructor are necessary for clarification purposes must be determined by other investigations. Many students in the tape-taught section expressed a belief that the tapes would have been less effective without these discussions.

The writer's personal reaction to the taped lecture approach may be of interest to those who might consider employing this method. With respect to the preparation of taped lectures, several points should be noted. First, it became obvious that the preparation of professional quality recordings is an inordinately time-consuming task. Since students have become conditioned to the excellent quality of radio and television broadcasting, educational recordings of high technical quality are most desirable. If financially feasible, professional editing of tapes would appear to be advantageous. Second, it is often difficult for a lecturer to generate the same degree of verbal enthusiasm and interest when speaking to a microphone instead of a class of students. On the other hand, the lecturer soon becomes aware of the excellent opportunities for organization of content and selection of appropriate phrases possible in the taped lecture approach. By temporarily halting the

recorder, one is provided with time to systematize ideas and select suitable expressions. In a typical classroom, the only extended pause at the instructor's disposal is signalled by the end-of-class bell.

Summary

An experiment was conducted during the 1960 summer session at Kansas State College of Pittsburg to test the hypothesis that a graduate course could be taught effectively with a series of tape recorded lectures. A research methods class was divided into two sections which were equated on the basis of scholastic aptitude as well as scores on two different types of achievement pre-tests. The control section was taught by a standard lecture-discussion approach while the experimental section was taught primarily by a series of 34 half-hour taped lectures. A brief discussion period permitted the instructor (in person) to answer questions regarding the taped lectures. On the basis of group performances on several criterion measures, no statistically significant differences between the tape-taught and conventionally-taught students were found. It was concluded that taped lectures, as employed in the experiment, served as an effective teaching device.

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Communication Theory and The Allport Concept of Structure

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IN HIS DOCTORAL DISSERTATION, George Gerbner writes: "Any theory of communication transaction involves the study of the exchange of energies and information in some form between systems. It is concerned with the *states of systems* and *messages—with being* as well as *with transaction*. Part of the underpinnings of a theory of communication should be, therefore, an *objective ontology of physical and physiological systems*, enabling theory to develop some firm criteria to guide its methodology and its dealings with processes."[1] (italics mine)

The purpose of this paper is to indicate how Floyd H. Allport's concept of structure can possibly provide the "objective ontology" that Gerbner calls for. The procedure will be to introduce Allport's event-structure theory and briefly present its main postulates, and then in their terms, to describe the 10 points in Gerbner's verbal model for communication (4). This will indicate that each point in the model is a substructure in the structure of the phenomenon of communication. And it will demonstrate how a system *comes into being, its condition,* and *transactions between systems.*

Allport has introduced his event-structure theory in two publications: an article, "The Structuring of Events: Outline of a General Theory with Applications to Psychology" (1); and a book, *Theories of Perception and the Concept of Structure* (2). His study of the theories of perception led him to present a synthesis, not of the theories in total but

[1] Gerbner, George. *Toward a Theory of Communication.* Doctor's thesis. Los Angeles: University of Southern California, 1955. p. 365.

of their major contributions. This synthesis is in terms of his event-structure theory which he had developed prior to the study and is, in a way, his means of checking the theory in an important area of investigation. It is in the article that Allport presents his synthesis on its own, in a broader context. He says:

> The purpose of the present article is to explore the possibilities that, notwithstanding the ubiquity, precision, and unquestioned importance of quantitative and covariational formulas, there may be in nature *another type* of law that is quite as universal, objectively demonstrable, and, in its way, precise. The writer believes that this is true and that the knowledge of such a possible nonquantitative, but still fundamental law (which, however, is neither "qualitative" nor "configurational") is as indispensable as quantitative formulations for a full understanding of any phenomenon, and that it is particularly needed at the present time in the field of psychology. It is to knowledge of this sort that we must turn for further illumination upon that still unsolved but vital problem, the organization of behavior.

And of this sort of knowledge, he says:

> It must deal with issues that transcend psychology and pertain to all the sciences; for the problem of the nonquantitatively lawful in nature is universal.

To introduce the explanation of his theory, Allport uses a simple behavioral situation which he divides into five successive phases (*A* to *E*). First he describes it in terms of the laws of quantity and covariation to see if they will describe and explain what is happening.

A. (1) The rate of evaporation varies with the temperature.

B. (2) The curvature of the lens varies inversely with distance from the object of vision. (3) A neural impulse occurs at full intensity or not at all, etc. . . .

At the end of the list we have no idea of what is occurring. Then he describes the same situation in this way:

A. A small boy on a warm day, becoming thirsty,

B. sees a pitcher of lemonade and a glass on a buffet.

C. He goes to the dining room table, pulls out a chair, places it near the buffet, climbs upon it, pours lemonade

D. from the pitcher into the glass,

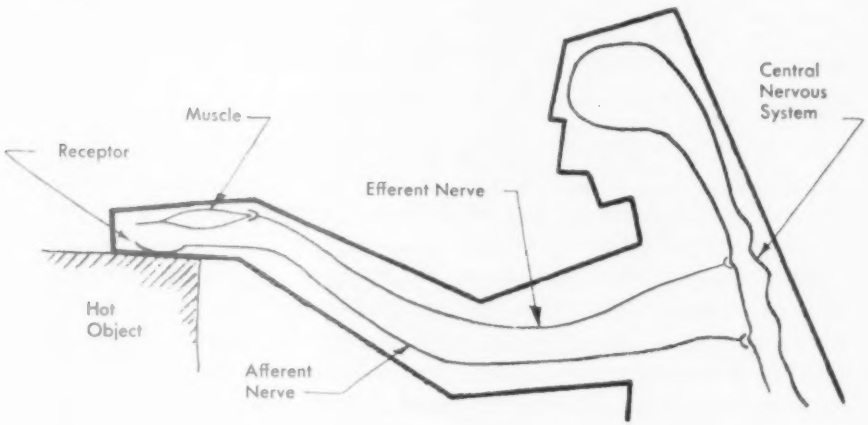
E. raises the glass . . . and drinks.

He says of the second description:

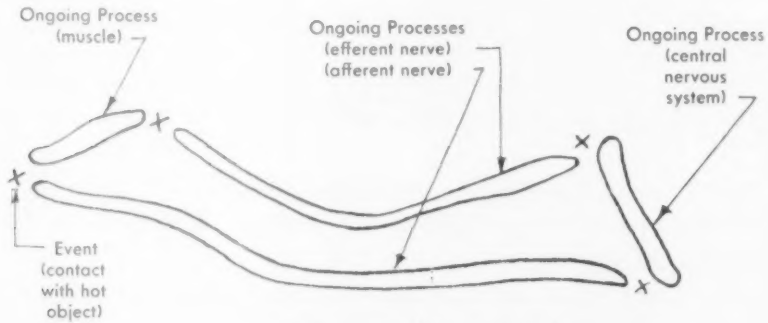
> Something *other than quantities* of happenings has now been added to the picture, with a resulting increase of our understanding. The significance of the laws is clarified, by showing that they are "contained," as it were, and ordered within a given self-delimited arrangement of happenings. Let us call this new "something" that is added to the quantitative laws in the form of a pattern of happenings the ***structure*** of the phenomenon in question. It will be seen that by this term we are

not referring to anything that is "static." It is, rather, a *dynamic* structure—a structure of *events*" (2).

For example, try to describe a hand on a hot object in quantitative and covariational terms only. This would give us quantities and their variations, but with no orientation, no relationships between each set of varying quantities: they could be anywhere at any time, were it not for the *structure* of the phenomenon, which is embodied in the sketch below.



The schematic sketch, below, represents the same situation in event-structure theory terms.



The crosses, X, are contact points between ongoing processes.

The crosses are events between ongoing processes. *Events* are points of contact only. They are not acts or processes. They do not partake

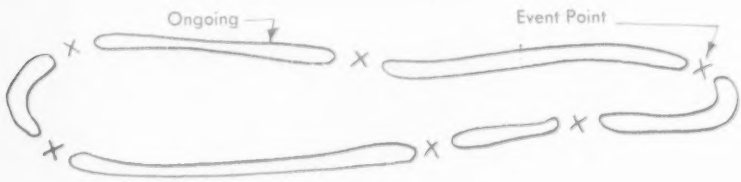
of time or space. "A single event, then, is a 'dichotomizing,' non-quantifiable happening, and nothing more" (1). *Ongoings* are continuous processes. Allport explains why they are represented as curves that close on themselves.

> Let us now return to the problem of representing the motion of ongoing elements in the model. In order to supply this feature, the ongoings must be represented as *curves*, each suggesting *continuous* motion: for it seems probable that at the minute levels of nature, particles *are* in continual motion and that their motion is cyclical or vibratory. Moreover, nothing ever starts from a position of ascertainable "absolute rest" or proceeds to another point of absolute rest. In fact, if we are to get away from a purely static conception, points in space and time are *definable only* as the points of conjunction between ongoings or motions (1).

Explanations of the *structure* of a phenomenon

> . . . must lie in the approximate "here and now" rather than in the remote past. The only way to accomplish this seems to be to cut across the conventional and absolute "time stream." One can think of time as the duration occupied by the successive ongoing processes and events of a particular pattern *that closes itself through a cycle of operation* (1).

With this brief introduction we will go on to the general postulates of event-structure theory. In the formulation of his theory in its most abstract form, to make it apply to all phenomena, Allport [2] has postulated three basic types of arrangement which he calls the "c," "n," and "r" lays of structure. The *"c" lay* (c for circular) covers the *self-closing cycle* aspect of structure. All series of ongoings and events tend to close in a cycle, and can be diagrammed like this:



The *"n" lay* (n for number) signifies the *multiplicity of ongoing-event cycles* that operate "in parallel" in any structure. Allport states it for behavioral phenomena in this way:

> In any act of behavior, after many points are stimulated on a receptor surface, many neural impulses travel, as it were, "in parallel," many cortical fibers are involved, many muscle fibers contract in their common role in a single effector movement, and so on.

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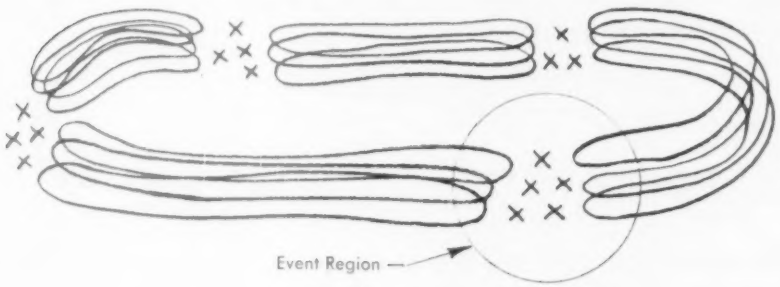
[2] Allport, Floyd H. *Theories of Perception and the Concept of Structure*. New York: John Wiley and Sons, Inc., 1955. Chapter 21, p. 614-67.

The "n" lay can be represented like this:

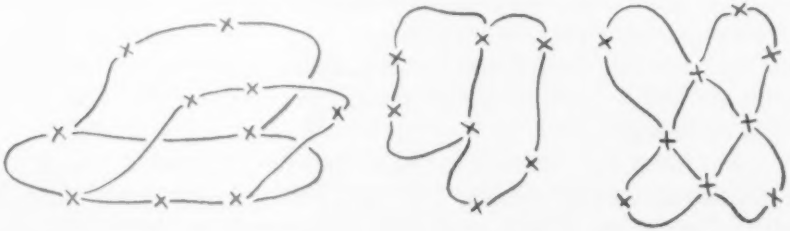


Instead of event points, we now have event regions. It is not certain an event will occur in an event region. The probable density of the event region is dependent upon the number of ongoings that enter and upon the chance encounter or contact of two ongoings in the space and time boundaries of the event region. The *"r" lay* (r for repetitive) provides for the *frequencies or time periods of each of the cycles.* Each cycle has a particular frequency of operation, adding its own element of chance that an event will occur between ongoings that enter an event region.

The three lays of structure, the "c," "n" and "r," must be thought of cojointly, for any structure partakes of all of them together. The "n" and the "r" lays provide for quantities, dimensions, and intensities in a structure, or in other words, the quantitative or covariational laws of science. In this way the two types of laws in nature—the quantitative and the structural—are always related, though distinct.

Ongoing-event cycles can be combined in various ways. To diagram this we will simplify by representing the multiplicity of ongoings with a single line and the event region with a single cross. Some examples of possible combinations follow:

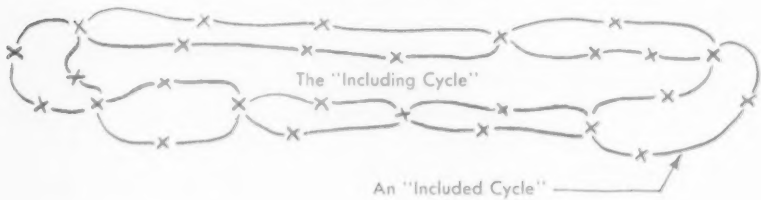
"Tangent Cycles" of Interstructurance



The preceding tangent cycles are aggregates of ongoing-event cycles. The "out-structural tangency" illustrated below is only open-ended contact between two cycles.

"Tangency" of cycles enables events to be "contributed" by one cycle to another, "positive interstructurance"; or to inhibit or prevent events in another cycle, "negative interstructurance," (as inhibitory impulses to a neuron).

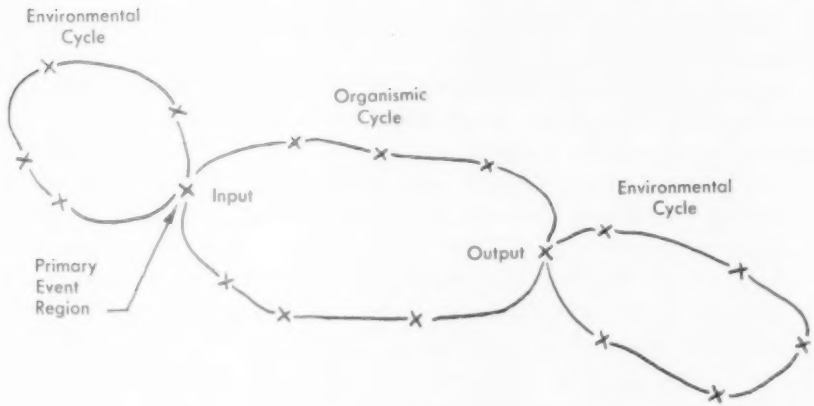
Compounded Cycles



The above cycles are in "out-structural tangency" with each other. They are now ongoings in contact with each other, closed in on themselves in a new cycle or structure. Compounded cycles can be units in even larger structures, and tangent cycles can be combined to form event systems, both of which provide the basis for the concept of higher and higher *"orders" of structure.*

This, in briefest outline, is the *format of structure* or *structural kinematics,* applicable to all phenomena. Intimately combined with this aspect of event-structure theory is the concept of *energics* or *structural dynamics.* Allport equates events and energy. Nothing happens in the universe, i.e., no event occurs, without energy. And, as shown in the diagram on the next page, the out-structural tangency of the organismic and environmental cycles or systems provides for the input and output of energies.

Contact made by the environmental and the organismic cycles increases the number of ongoings ("n" lay) that enter the primary event region. The "r" lay of both cycles also helps determine the number of



encounters or events that take place between ongoings. So these two "lays" of the structure of the two cycles will determine the energy level at the primary event region. The organismic cycle, however, is "autonomous"; in other words, it has *its own proper level of energy to maintain itself as a structure*. If it were a closed system, this energy level would represent the *entropy* of the system. But it is a semi-open system and when energy is added through the primary event region (as input), it is communicated around the system and raises the energy level of the system as a whole. This would constitute its *negative entropy*. When contact is made with another environmental system, it tends to give off energy (as output) until it has brought itself into equilibrium with the environment and returned itself to its proper energy level. This seeking of equilibrium and an autonomous energy level constitutes the *homeostasis* of the system.

One more basic concept remains to be mentioned—that of closure. *Kinematic closure* is the completing of the format, the closing of the cycle ("c" lay), with the possibility of repeating the cycle ("r" lay). *Energic closure* is the coming to equilibrium of the cycle's energy level, with that of adjacent cycles in contact with it.

Now let us consider Gerbner's verbal model for communication (4) in event-structure theory terms. The verbal model states that: Someone / perceives an event / and reacts / in a situation / through some means / to make available materials / in some form / and context / conveying content / of some consequence. The situation we will use is that of someone who, seeing a fire in a neighbor's attic across the street, picks up the phone and informs him of it.

Someone. Any human being can be thought of as a very high order ongoing-event system or structure.

Perceives an Event. The pattern of light disturbance in the atmosphere, caused by the fire, contacts the eye and transmits energy to the latent ongoing-event cycles in "someone" that had been formed by previous experience with fire, and brings their energy levels up to autonomy where they can operate as a structure in transmitting energy to the reaction cycle that follows.

And Reacts. Reaching for the phone is composed of a series of ongoings and events that come to closure in bringing the phone up to "someone's" ear and mouth.

In a Situation. The community in which the incident occurs is a structure of cycles of ongoings and events.

Through Some Means. The telephone system is a structure of cycles of ongoings and events.

To Make Available Materials. The administration of the telephone system is a structure that determines whether "someone" and his neighbor can afford phones and whether they are kept in working order.

In Some Form. The pattern of the words that "someone" says to his neighbor on the phone is a series of ongoings and events that we can assume, for the present, close in on themselves to form a cycle. It operates as a structure in transmitting energy to the latent "house on fire" structure within the neighbor.

And Context. The context in which this behavior occurs is the structure of the friendship of "someone" and his neighbor.

Conveying Content. The content conveyed is the latent "house on fire" structure within the neighbor that is re-energized or brought up to its autonomous level.

Of Some Consequence. The structure of the action taken by the neighbor in putting the fire out is the consequence of "someone" having called him.

The diagram on the next page is of these event-structures in contact with each other.

When contacts are made (events occur) between the event-structures shown in Diagram A (which we can now consider as ongoings), their positive and negative interstructurance, along with probability which is always operative, determine the chances of a new series of ongoings and events closing in to complete the format (kinematic closure) of a new event-structure. "Someone" has seen the fire and called his neigh-

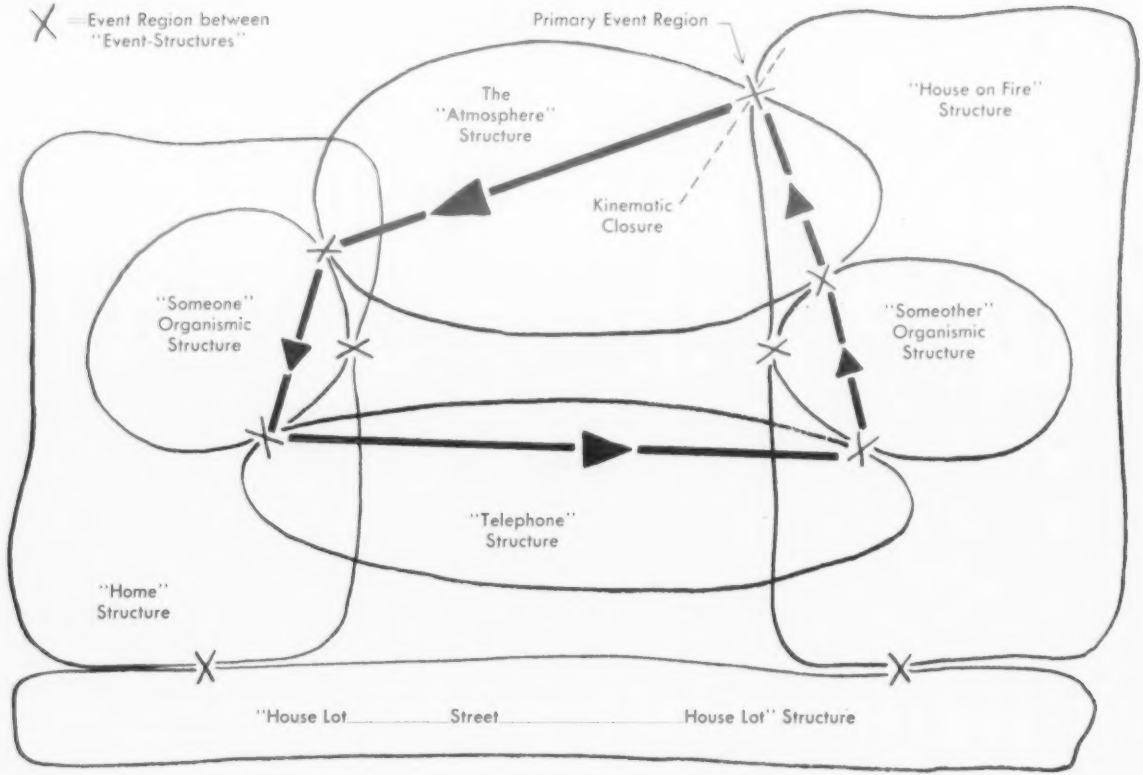

= Event Region between "Event-Structures"
Primary Event Region
The "Atmosphere" Structure
"House on Fire" Structure
Kinematic Closure
"Someone" Organismic Structure
"Someother" Organismic Structure
"Telephone" Structure
"Home" Structure
"House Lot Street House Lot" Structure

DIAGRAM A

bor. The series of ongoings and events that this entailed comes to kinematic closure when the "someother" organismic structure looks up and sees the fire. Kinematic closure brings a new structure, communication, into being.

When the energies released by the fire into the communication cycle at the primary event region come to equilibrium in the cycle, energic closure occurs. Part of this coming to equilibrium is the "someother" organismic structure's overt behavioral structures in putting it out. Thus energic closure can be called the consequence of the communication that came into being with kinematic closure.

In conclusion, I believe we can now say that certain of the postulates of Allport's event-structure theory provide "part of the underpinnings of a theory of communication . . ." the objective ontology that Gerbner called for. *Kinematic closure* accounts for the *coming into being* of a system. *Structural kinematics and structural energics* explain the *conditions or states of a system*. And the concepts of *interstructurance and energics* provide for *transactions* between systems. These postulates should enable "theory to develop some firm criteria to guide its methodology and its dealings with processes" (3).

The next step in investigating these possibilities, I feel, is the application of Allport's analysis of the concept of "meaning," to the communication process. With a working hypothesis of what we mean by "meaning," we can proceed to develop our models for communication so that they will allow any facet of the process to be given its functional position. In our research we will then better know what it is we are looking for, and can better build a structure of understanding with the data we uncover.

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SYSTEMATIC COVERAGE FOR A NEW EDUCATIONAL FIELD

STARTING WITH THE CURRENT ISSUE of AVCR, this department will present articles, abstracts, and news notes dealing with research and experimentation on auto-instructional methods and media. It is felt that a separate department devoted to this field is warranted by the rapid expansion and specialized nature of this trend of development in instructional technology, which—after having lain largely fallow for 30 years following Pressey's original work in the 1920's—has literally mushroomed in the past few years, commencing with B. F. Skinner's 1954 paper in the *Harvard Educational Review*.

Theoretical papers, reports of completed research, and notes on experimentation or programming developments in progress, together with information on new techniques or hardware in the teaching machine field, will be considered appropriate for publication in this department.* It is planned, also, that some of these papers, and others appearing elsewhere, may be collected and later republished, perhaps in 1962, as a second volume of readings supplementing the 1960 volume, *Teaching Machines and Programmed Learning*, edited by Lumsdaine and Glaser for the Department of Audiovisual Instruction. As an indication of perspective and (hopefully) scope for this new department of AVCR, its editor would like to quote the following comment from the Concluding Remarks which he and Glaser wrote for TMPL.

> Much of the present work may be transient in its specific significance. As research and development proceed, the focus of attention might shift. . . . As such, the terms "teaching machines" and "programmed learning" might disappear. . . . Future experimentation may alter current ideas about transfer to criterion performance from constructed or selective responses. The role of reinforcement and feedback may be differently conceived, and present conceptions of the importance of overt responses might change. Emphasis on fixed- versus variable-sequence programs may also be changed, both by the discoveries of experimental psychologists and by engineering innovations which affect the relative feasibility of implementing different approaches. Current approaches to program construction might give way to new methodologies. . . . Any or all of these and other changes may take place . . . *without altering the basic conception that instruction and learning are amenable to systematic description and improvement through experimental inquiry*. The significance of the approach

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represented by teaching machines and programmed learning lies primarily in its assumption that this is possible, rather than in the specific characteristic of machines, of programmed materials as they currently exist, or of theoretical points of view that underlie current efforts.[1]

It is to be hoped that both the viability of specifics and the perseverance of basic conception characteristic of the work to date will be reflected in the future development and evolution of the field as reported in these pages. For the present, the paper by Dr. Klaus in this issue might be considered as a point of departure from which this subsequent evolution may proceed. As another recent statement of provisional "rules" or suggestions to the novice programmer, the reader may wish to peruse E. Z. Rothkopf's paper, "A Do-It-Yourself Kit for Programmed Instruction" in the December 1960 (Vol. 62, No. 3) issue of the *Teachers College Record*.

—A. A. LUMSDAINE

[1] *Teaching Machines and Programmed Learning*, edited by A. A. Lumsdaine and Robert Glaser. Washington, D. C.: Department of Audiovisual Instruction, NEA, 1960. p. 563-64.

THE ART OF AUTO-INSTRUCTIONAL PROGRAMMING

*David J. Klaus**

WITH THE POSSIBLE EXCEPTION of large-scale group testing, no one development in the field of psychology seems to have as much potential for the better utilization of human resources as auto-instructional methods. The technique has promise for producing a genuine and large scale improvement in educational practices and, as a consequence, it is expected to have a tremendous impact on the quality of classroom instruction. Because of the novelty of the technique and its potential impact on education, it is not at all surprising that auto-instruction is more frequently talked about than understood, and that more predictions are made as to its potentials than facts are collected as to its capabilities.

Perhaps more than anyone else, the professional educator should keep himself well informed as to where auto-instruction has been and where it is going. He should know not only the facts and the forecasts, but since he has the responsibility for wisely using these materials, it is especially important that he become acquainted with the art of programming—the preparation of auto-instructional programs.

Sooner or later, educators and teachers are going to have full responsibility for writing programmed materials for classroom use, but unfortunately, programming is still a skill about which we know very little. The rules we have are

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incomplete at best, and for this reason, perhaps the greatest need at this moment is for a clarification of the techniques involved in preparing auto-instructional materials. Efforts along these lines will not only facilitate increased research and development, but will permit the preparation and rapid utilization of a large number of programs in our schools. But before illustrating what appear to be important characteristics of good as opposed to poor programs, it may be helpful to describe a little about what programming is, where it has been, and where it may be headed.

In essence, the auto-instructional method promotes the orderly and controlled development of an individual's skill in much the same way as a good tutor might do. By presenting lessons in small, carefully sequenced steps, complicated skills can be developed by gradually progressing from very simple to very complex levels of performance. Since the student must perform actively at each step during training, it is possible to carefully guide the development of his skill by means of immediate confirmation as to the correctness of each response. Furthermore, the auto-instructional technique facilitates the evaluation and improvement of the materials during the course of their development in that the difficulty level or contribution of each step can be carefully ascertained and, when necessary, any step may be modified or revised.

In Figure I three frames from physics are used to illustrate how programmed materials of the kind we have been preparing at the American Institute for Research appear to the student. As illustrated in Frame I, the student is exposed to material in the form of a small step which is designed in such a way as to encourage him to respond. Before beginning the program, the student is told to respond while he reads through the frame. In general, he is to write his answers either directly in the book where the frame appears, on a separate answer pad, or if an auto-instructional device or "teaching machine" is used, on a strip of paper. As soon as he has completed the three responses called for, the student can expose the correct answers either by turning a page or advancing the machine. There, the student would see the three answers, *heat*, *energy*, and *heat*, which he can

Frame 1	A fire can keep us warm because it gives off energy in the form of ..... The sun also gives off.....in the form of.....
Frame 2	Heat is one form of..... Physicists call it thermal energy. A quart of boiling water has more.....energy than a quart of cold water.
Frame 3	As a warm object grows cooler, it loses heat, that is, it loses .....energy. When a cool object gets warmer, it gains ....., that is, it gains*.....

* The asterisk indicates that more than one word belongs in that space.

FIGURE I. *Three frames from a program in physics.*

check against the responses he had given. Then, the student would again turn the page or advance the program and look at the second frame, shown in Frame 2.

The student again would respond and then check to see if his answers are correct. He would then turn to the third frame, shown in Frame 3. Learning that heat is energy, or more specifically, thermal energy, is not very astonishing in itself. But in terms of a high school physics program of 15,000 or 16,000 frames, it can be seen how each small step gradually and systematically produces a substantial amount of learning.

Research already accomplished indicates in a general way what can be achieved by means of auto-instructional programs. Under the sponsorship of the Office of Education, Dr. Lumsdaine and I prepared six weeks of high school physics in auto-instructional form. From these studies we were able to conclude that when used as a supplement to an otherwise full program of instruction, programmed materials do add significantly to student achievement. Furthermore, the evidence we obtained also suggested that auto-instructional programs may be relied upon to provide instruction, in physics at least, independent of classroom lectures and recitation.

The use of auto-instructional programs has not been limited, of course, to developing proficiency with the facts and concepts of physics. Holland and Skinner at Harvard University have prepared a considerable portion of the introductory psychology course in programmed form. Glaser and his associates at Teaching Machines, Incorporated have prepared a program to teach descriptive and inferential statistics at the college level, and Eigen and Komoski* at Collegiate School have prepared a program to teach logic to children at the elementary school level.

Industrial organizations have also begun to explore the value of auto-instructional materials for their technical training programs. We recently assisted a group of psychologists and instructors at IBM as they began the preparation of programs to teach the operation and maintenance of equipment as well as the programming of giant computers. At HumRRO in Washington, Rocklyn has prepared a program which provides instruction in oral Russian which can be used, despite the limited vocabulary involved, to deal with Russian speaking individuals; Shettel and Angell at the American Institute for Research have prepared a program to teach certain perceptual skills involved in the operation of a SAGE center to Air Force trainees; and Audrey Holland has prepared a program at the University of Pittsburgh to provide preliminary corrective ear training to students with articulatory speech defects.

We now have reason to believe that even higher order skills than these can be taught by means of auto-instruction. We are currently engaged in an investigation of methods for teaching art judgment. While the program being prepared will include some information on art history and principles, it has as its major purpose the development of a feeling of appreciation for art and the ability to differentiate good art from that which is not. We are also attempting to develop a program to provide laboratory

* Mr. Komoski has been named president of the newly established Center for Programed Instruction, 365 West End Avenue, New York, N. Y.

instruction in electronics which will involve the use of actual laboratory equipment and a program to instill in students the insight necessary to solve geometric theorems which they have never before seen.

The success we have achieved thus far in broadening the applications of auto-instructional programs has led many of us to a feeling of cautious enthusiasm with respect to the progress that has been made. As more research is completed and more programs developed, we should have a still better understanding of the role that auto-instructional methods might have in the classroom of the future. The research that will contribute toward this goal must be carefully done. One of the most encouraging characteristics of auto-instructional materials is that they almost uniformly are capable of providing individual instruction, no matter how well or how poorly the program is written. All programs are not, and most certainly will not be, of equal quality. Until more objective and empirical measures of auto-instructional effectiveness become available, the educator must be adequately sophisticated in his judgment to evaluate the teaching competence of a program he might use in the classroom.

The educator must also be aware of the pitfalls in doing research on auto-instructional technology, both with regard to his own work and to evaluating experiments by others. The results of a study which depends on a poorly written program should be interpreted accordingly. Programming is at least as much of an art, at the current time, as clinical psychology, for example. No matter how fine an experimenter one is, he is not in a position to evaluate clinical patients using a Rorschach or base a study on his interpretation of projective test protocols unless he has been thoroughly trained in clinical techniques. Similarly, despite how well the experiment has been designed, its implications for a science of programming are limited if the program writers have not had sufficient experience. This is especially true when the sequence of frames is very small. A surprising number of studies have been carried out using a "program" only 50 or 60 frames long. The validity of the conclusions drawn from such experiments should be strongly questioned.

Programming Steps

Now to return to the problem of how programs are written. Because it is the area with which I am most familiar, I will describe the procedures we have been using to program physics at the American Institute for Research. It should be noted, though, that the technique for preparing programs varies from individual to individual and, furthermore, that it is frequently modified because of the nature of the subject matter involved.

Our first step is to list with care the specific objectives we will attempt to achieve with the program, expressed in clear, behavioral terms. Most often, these objectives represent criterion behaviors, that is, the particular responses we would like to see in the student's repertoire when he completes the program. For academic material, criterion behaviors often can be expressed in terms of a comprehensive test covering the entire course.

It is at this point that we make some initial decisions as to what kind of program will be constructed. For example,

if the test (and the goal which it represents) requires only the ability to recognize the correct alternative as on a multiple-choice test, the programmer will attempt to achieve only this goal. It is not necessary, then, for him to prepare frames requiring constructed responses similar to those in the preceding figures. In the same way, if the student is required to know how to use a particular formula but not remember it, the programmer will plan to teach him just that, and no more. It has been our experience that, for academic subjects at least, the educational goal usually is to provide the student with the skills necessary to recognize a given principle when he comes across it, express the principle using his own words, and apply the principle to a new situation or problem. Typical criterion behaviors which might be listed for a unit on heat, for example, might include such questions as: What is heat? How is it measured? What is the principle of linear expansion? Show how Boyle's law might be applied, and so forth.

Once the objectives have been identified, the next step is to carefully prepare a course outline covering the material that we wish to teach. The outline is frequently derived from a number of textbooks, reference sources, and from the comments of teachers familiar with the subject matter area. In addition, we have found that it has been highly desirable for us to obtain the assistance of a technical expert in the subject matter field. This expert is given the task of reviewing the materials prepared at each phase of the program's development and is indispensable in preventing the dissemination of errors. We have also found that a well-qualified expert frequently can supply a large number of specific examples and interesting illustrations which can be incorporated into the program.

The third step in our procedure is to begin the preparation of draft frames. One of our programmers is assigned to each major unit and he or she is responsible for drafting groups of frames which cover the subject matter contained in the outline in such a way as to achieve the behavioral objectives of the course. We find that the process of drafting frames often points to inadequacies in the outline. Breaking down material into very small steps frequently identifies not only omissions in the outline but instances where it contains material which does not reflect the course objectives.

The draft frames are then edited three times. The first editing is done by another programmer who attempts to simplify the program and discover errors which the original programmer has made. The second editing is done by the technical expert who reviews the frames to insure their technical accuracy. A third editing is done by someone skilled in writing. Frames, just like textbooks, can either be interesting or dull. Our third editor reviews frames, rewording those that are awkward or unclear and revising others so that the program is enjoyable to work with as well as instructional.

At this point, the most important step in the preparation of a program is begun. The frames are shown to a trial subject who proceeds through the program as a student might eventually do in a classroom. Each answer is carefully recorded and, on the basis of the data obtained, the program is revised as much as necessary by either adding new frames or rewording those already in the program. It is at this step, possibly, that the

difference between auto-instructional techniques and what many teachers do in the classroom is most pronounced. In programming, we assume that the burden of instruction rests with the program and not with the learner. Thus, when the student makes an error, it is assumed to be the fault of the program and not some inability on the part of the trial subject.

When the frames are revised, the trial procedure is repeated. In fact, 10 or 15 trial subjects are often used in the preparation of a single sequence of frames. The programmer is rarely satisfied that his materials are as good as they can be until trial students not only show that they have mastered the material in terms of how well they do on the criterion tests, but can proceed through the program without making an error. Following the last revision of the program, the frames are again reviewed by the technical expert and only then are they reproduced for field tryout.

The most difficult step in this procedure is the actual writing of the frames. As I noted earlier, we have barely begun to understand what makes a good frame. We do have a number of leads, however, that can be derived from laboratory studies of animal learning. I have discovered that educators often have a particular aversion to discussing the problems of classroom education in terms of how animals learn in the laboratory, but watching a rat, pigeon, or a chimpanzee learn can be a very instructive experience. The laboratory animal is not burdened with problems of low aptitude, inadequate readiness, lack of interest, or an unfortunate home life. Instead, the experimenter accepts the animal as is and modifies his own behavior to the extent necessary to produce learning.

The aspect of animal learning with particular importance for preparation of an auto-instructional program is the methods used for initially generating the correct response. Not only are these methods important with respect to auto-instruction, but perhaps one of the prime objectives of research in education today is the discovery of techniques for getting appropriate responses to occur initially. Probably this is our most ineffective skill in education and training. In teaching swimming, for instance, it is often quite difficult to get the correct response to occur the first time. The same is perhaps equally true of physics or spelling. The fewer similar or equivalent responses the student has, the less likely the responses are to occur at the appropriate time in the training schedule for practicing and reinforcement.

In the laboratory, we often wait until the animal makes a response before reinforcing him. We have found, though, that it is not necessary for the animal to make a complete response, but only make responses which are preparatory or similar to the desired response. If we reward these preparatory responses, a procedure called successive approximations, we speed training since the animal is taught behaviors which make the criterion behavior more likely.

Another procedure is to control the environment in such a way as to prevent erroneous responses from occurring. For instance, we can reduce the size of the apparatus until almost the only response that the animal can make is the desired one. The third possibility is to build on the animal's previous

learning. We can teach a rat to run through a complicated maze quite readily if we first train the animal to follow lights and then place the lights appropriately in the proper alleys of the maze. By and large, these procedures are not systematically employed in education. For example, while we try to limit the environment in the laboratory, teachers are often encouraged to decorate their classrooms and provide other stimulation which, in fact, produce unwanted responses rather than eliminating them. I have always been struck by the amount of time a teacher spends in carefully decorating her room and the subsequent difficulty she has in maintaining the attention of students who are attracted to the displays she has put up.

Despite the rather obvious implications these laboratory studies have for improving instruction, a surprising number of programs have been constructed on the philosophy that the student is bound to make errors while learning. These programs typically incorporate a feature which is called branching, that is, alternate sequences to be used by the student after he has made an error. The same philosophy leads to the construction of devices which are capable of preventing cheating. One wonders, though, whether branching or cheating must be a problem in education. After all, since we want the student to practice being right, why not help him as much as we can? In preparing auto-instructional materials, then, the programmer generally makes every effort to carefully guide the student through the required learning. He designs the program so that it plays an active role in insuring that learning will take place and that the proper responses will be those that are practiced.

This particular approach to learning, which depends largely on placing the pupil in a carefully controlled environment, is not necessarily alien to education. Credit for the suggestion that instruction might be automated by properly arranging the circumstances in the student's environment is often given to Socrates or Pressey or Skinner. It is my own feeling, though, that many of our current notions on auto-instruction were accurately anticipated by John Dewey. To him, learning came about by doing; not random doing, however, but doing under such careful control that the student would necessarily meet with success when he was exposed to the consequences of his actions. Controlled or guided practice which leads to reward is the central theme in both Dewey's approach and that used in auto-instruction.

Programming Rules

Now, let us look at some of the rules we have for building frames. While these rules generally represent the theory of auto-instructional programming rather than experimental evidence, they illustrate the auto-instructional method and thus might be a help at this time. The first is, that the student learns from making a response and not from hearing or seeing it. Only by practicing a response will a student learn and retain it.

In programming, the question often arises as to whether it is important that the student make his response overtly or whether it is sufficient for him to make a covert response. With respect to simple verbal material, there appears to be no difference produced by these methods. On the other hand, if the goal of the program is to develop some manual

or perceptual skill, active responding seems to be very important. The same is true when the student is apt to overestimate the ease with which he learns. Only when the student writes out a new and unfamiliar word does he receive the necessary practice in spelling it. Pronouncing the word to himself will not likely yield as satisfactory a result.

Another question that often arises is whether to require multiple-choice or constructed responses. Since they are capable of doing so, programs can and should encourage the student to express his ideas in his own words. We then are sure that the student's practice is of the kind we usually want to generate; by means of constructed responses we require the student to use and explain what he knows so that he practices presenting his ideas and his knowledge instead of simply recognizing a correct answer from among the alternatives given. There is still one more advantage to having overt, recorded responses. This is to provide the programmer with the data necessary for further revision of his program. The first rule of programming: *require active responding.*

The next concern of the programmer is how to insure that the student will make a correct response, especially the first time that particular response is required. Aside from the laboratory methods described earlier, the programmer can get assistance in this matter by studying the techniques used in advertising. In most instances, the advertiser is primarily concerned with producing the initial response. Some of the more effective advertising we have is based on the contiguity learning principles of Guthrie and Estes. Their theories suggest that a given response can be readily produced providing we mass sufficient cues and present them all at the same time. When driving down the highway, a motorist is apt to come to an intersection where his stopping is made rather certain due to the presence of a stop sign, a flashing red light, and appropriate yellow lettering on the pavement.

In programming, each frame must contain sufficient cues to produce the desired response. Sometimes we can get the proper response to occur by the use of wording; at other times, we may use rhyming, synonyms, or particular word patterns we can assume are already in the repertoire of the students involved.

Appropriate cueing is one of the essential characteristics of a good frame. In fact, this is the essential difference between a test question and an auto-instructional frame. In giving a test, we design the items in it to at least partially lead the student astray. We don't want every student to get every answer correct. In a well-constructed program, however, every effort is made to insure that every student gets every response correct. The second rule: *proper cueing.*

The fact that a student can make a correct response is rarely of interest to us unless the response is made in the appropriate context. Little Johnny may be doing an excellent job of pronouncing "daddy," but after the first few times we hear it, we fail to think much of this response unless it occurs in the presence of the proper man. As learning proceeds during the course of using an auto-instructional program, the student must be gradually weaned from the liberal cues we have supplied, so that he can make the correct response without our help in the presence of the relevant context. Third rule for writing a good frame: *appropriate context.*

Together, these first three rules can be combined to describe a good frame. Basically, a good frame consists of only four parts. First is the response, selected beforehand. This is the part of the frame that must be left blank. Too frequently, a beginning programmer fir that even though he has selected a satisfactory response, he constructs the frame in such a way that some irrelevant word rather than the desired response is practiced. The second portion of a good frame contains whatever cues are necessary to reliably produce the desired response. Neither overcueing nor undercueing is desirable. The third characteristic of a good frame is that it contains some relevant context, that is, the kind of stimuli we hope will be capable of evoking the desired response at some time in the future. Early in the program, context will probably be at a minimum and cueing will be quite prevalent. By the end of the program, however, cueing should have vanished so that the appropriate responses are made solely in the presence of the appropriate context. The fourth ingredient of a frame is optional. We call it enrichment. We have found that, in many instances, interest in a program is heightened by inserting facts such as names or dates which are relevant to the material being covered but not part of the course objectives. Aside from these four ingredients, everything else in a frame is superfluous.

The next characteristic of a good program is that it proceeds in very small steps. This is a rather difficult point to get across to a new programmer. Several studies have indicated, however, that the more steps, the better. In fact, the data seemed to indicate that a student proceeds faster through a program purposely made longer by the division of frames into smaller units than he does through a very condensed program. The number of frames in a program is not necessarily a good index of its efficiency, but as is the case in many other areas, one seems to get what one pays for, that is, the more frames the better. Rule four: *small steps*.

As the program is developed, the role of careful sequencing becomes evident. Most subject matter consists of material of unequal difficulty. Complex concepts are built on simple concepts. Long involved formulae often can be shown to represent several shorter formulae combined together. In preparing a program, the writer can greatly enhance its efficiency by thoroughly determining beforehand what the sequence of topics will be. The fifth rule of programming: *careful sequencing*.

Another problem having to do with the program as a whole is the problem of how often and how frequently a response should be practiced. As was the case with the number of steps, the rule here seems to be that the greater the number of repetitions, the better. The repeated review of a given response is almost universally more irritating to the programmer than it is to the learner. In the first place, the program writer already knows the response. To him, frequent repetitions are terribly tedious. From the student's point of view, however, repetitions can be terribly important. It is one of the basic principles of learning that retention of a response depends quite heavily on the amount of overlearning that has taken place. Thus, when a student complains of having made a certain response too often, we should be careful not to delete so much

practice with that response as to affect its retention.

One guide to assure that repetition is frequent enough is that the programmer, in reviewing his own frames, should be sensitive to his echoic behavior. When a particular response stops ringing in his ears, it is probably time to review that response in the program. It is probably helpful, in addition, to introduce as much variation as possible in the cueing and context associated with a particular response each time it is repeated. This kind of variability can be expected to reduce monotony and also to induce a desirable amount of generalization with respect to that response. The sixth rule for programming: *frequent repetition.*

The next rule concerns the technical accuracy of the material contained within the program. The preparation of an auto-instructional program is a great amount of work. Too often, a writer engages in the necessary effort but fails to realize that the very excellence of his program in a psychological sense insures that his students will learn well, but learn the wrong facts and concepts. Insuring technical accuracy, of course, also involves the inclusion and exclusion of material. It is often the case that a programmer attempts to include too much into his program to permit the proper coverage of any one topic. In general, it is probably more advisable to do a thorough job on somewhat less material than an incomplete job on a larger amount. The seventh rule: *knowledge of the subject matter.*

Now we come to a few don'ts. Probably the most common mistake made by a beginning programmer is that he prepares the frames as if he were a lecturer presenting information.

The lecturer can be contrasted with the tutor or auto-instructional program in that he guides the student in what to learn but then delegates to the student the responsibility for structuring the material in small steps, for sequencing these steps, for scheduling sufficient practice, and for meeting with the success that will serve to reward desirable responses. Imitating a lecturer, the inexperienced programmer writes a paragraph for the student to read and follows it with a question which the student is expected to answer. Frame A shown in Figure II is an example of this type.

Programmers lecture in frames when they are not sure what they want to teach, when they have not clearly identified the specific objectives of the frame. Analyzing this frame in terms of cue, context, and response, we see that it is quite possible that a student could answer the frame solely on the basis of the last sentence. The other material in the frame, representing facts which the programmer might want the student to know, neither helps produce the response called for nor does it provide the kind of context in which we want the response of temperature to necessarily occur. In programming, we not only provide facts to the learner, but we help him to learn. If the student doesn't understand, it is our fault, not his. This is the eighth rule of programming: *don't lecture, teach.*

Frame B illustrates another very common error made by beginning programmers. Here the programmer had the beginnings of a quite satisfactory frame, but after he had written out a statement, he then selected a rather trivial word to be filled in by the student. The frame could be improved tremendously had he left the word "liquid" where the blank is now and removed the word "expand."

Frame A	Temperature and heat have different meanings. Heat, the amount of thermal energy stored in an object, depends on the mass of the object and what it is made of as well as its temperature. Heat is measured in calories, but since heat and temperature are not the same, we do not measure.....in calories.
Frame B	In general, liquids, solids, and gases will expand when heated. Kerosene is a.....; it will expand when heated.
Frame C	Most metals contract when they solidify, but there are exceptions to this rule. For example, bismuth and antimony do..... contract when they go from a liquid to a solid state.
Frame D	Copper, iron, wax, and glass all contract when they solidify. Most substances, in fact,.....when they go from a liquid to a solid state.
Frame E	An astronomer, Anders Celsius, invented the centigrade scale of temperature. A thermometer which reads 100 degrees in boiling water is measuring the temperature of the water according to the .....scale of temperature.
Frame F	The centigrade scale of temperature is more properly called the .....scale, after the name of its inventor.

FIGURE II. *Six frames illustrating weaknesses and strategems in programming.*

It is the concept of expansion, after all, which the programmer was apparently attempting to teach. Advanced programmers sometimes make almost an opposite error. They decide that because the word or response itself seems trivial, it is not important enough to be left blank.

Frame C illustrates a frame that calls for such a response. Here, the word "not" *is* important. The fact that bismuth and antimony do *not* contract is the point we are trying to get across. The ninth rule of programming: *evoke a relevant response.*

Frame D illustrates another one of the rules. It illustrates how we can frequently depend on rather subtle cues to insure that the appropriate response will occur. It was not necessary, in this instance, to tell the student previously that most substances contract when they solidify. Instead, we have let the student make his own generalization and discover his own principle. The tenth rule: *don't provide more cues than necessary.*

Now look at the next frame (Frame E) in Figure II. This frame, while not especially well written, does get its point across but it also illustrates another important error. The programmer may have assumed that his students would recognize the relationship between 100 degrees, boiling water, and the centigrade scale of temperature. I suspect that if we tried this frame on a large number of students, we would find that several of them would make the error of inserting the word Fahrenheit (if they

could spell it) into the blank. This is our eleventh rule: *don't assume too much knowledge.*

In the last frame in Figure II (Frame F), we can see that the author failed to recognize that we learn from responding and not from reading. It is very unlikely that the response *Celsius* would be evoked here in the average student unless he had previously learned the astronomer's name. Recalling the preceding frame, we can see one possible source for the programmer's error. He attempted to present too many facts within a single frame. The twelfth rule is: *don't present two new facts in one frame.*

These twelve rules sum up much of what we know about the art of programming at this time. As noted earlier, they tend to be incomplete, and we have not yet achieved our objective of being able to provide firm directions to beginning programmers. The lack of definitive rules, however, does encourage many programmers to experiment and thereby produce new rules and new concepts of programming. Perhaps one of the greatest errors that a programmer can make is attempting to copy the kinds of programs he has seen before. His objectives will frequently be too minimal, his program uninteresting, and he will fail to produce the kind of learning that he feels should occur in the classroom. There is no reason, for instance, why the blank in a program shouldn't represent a sentence or two. As another example, there is no reason why the programmer can't employ pictures—or for that matter, even have the students draw their own. We have used both of these kinds of responses in our physics program.

The last two frames I would like to illustrate both represent instances where the student is required, in terms of the way the frame is structured, to create a response which he may never have seen before.

The first frame in Figure III (Frame G) is an example of this type. Here the word "also" cues the response. The student may never have seen the word "Kelvin" before, but yet he is able to respond that Kelvin is a scale of temperature. This frame also illustrates the use of the instructional approach which I have been describing. In programming, the primary objective of each frame should be the active participation of the student in terms of carefully guided or controlled practice. An autoinstructional program should not attempt to explain a principle to a student. Instead it should carefully lead him, one step at a time, toward the desired level of proficiency. Here, in this frame, we

Frame G	Centigrade and Fahrenheit are both scales of temperature. Kelvin is also a *.....
Frame H	Knowing that most metals expand when heated, and remembering that the period of a pendulum depends on the length of the rod, we would expect that a pendulum clock would.....time on a cold day.

* More than one word belongs in this space.

FIGURE III. *Two frames that lead to discovery by the student.*

have done more than could be accomplished by presenting the fact that "Kelvin is a scale of temperature" to a student; we have forced him to actually practice the correct response, in the proper context, with a minimum of cues.

The next frame (Frame H) illustrates further the non-rote quality of learning possible to achieve with an auto-instructional program. In a frame of this sort, which ordinarily would have been preceded by steps which taught the two facts appearing in the first part of the frame, the student is encouraged to discover some new fact about the world around him. In neither this nor the preceding frame do we depend on explanations. Instead, we have tried, subtly, to guide the student and help him experience the satisfaction of being right, all on his own.

One of the greatest contributions which programming is likely to make to education is the clear realization and understanding of the learning and instructional processes. I suspect that concepts such as the careful control of responding to insure its initial accuracy may improve classroom teaching whether or not auto-instructional programs have been devised.

What I am saying is that the means for placing materials on paper is not as important as our understanding of the instructional process. To illustrate, not too long ago I read somewhere of a technique used at a school where every effort was being made to teach the children cooperation as opposed to competition. While this only represents one small part of the training that would likely be necessary, I feel it was an ingenious solution to provide the children in the pre-school playground with an assortment of toys of the kind that required the cooperative activity of two or more children. That is, teeter-toters instead of swings, and wagons so large that the strength of two children was required to move one. This example of programmed learning of a social skill or habit illustrates the point that while it may not always be feasible, practical, or economical to provide instruction independent of a human teacher, there seems no reason to believe that if a skill, fact, or concept can be taught, it would not be possible to achieve it using auto-instructional methods.

A WORLD-WIDE PROGRAM OF AUDIOVISUAL EXCHANGE

*Eric W. Bauer**

SINCE THE END of the second World War, European nations have developed an intensive program of educational cooperation and exchange, as evidenced in the activities of international and regional organizations. Through its annual educational conferences in Geneva (arranged in cooperation with the Swiss Bureau International d'Education), UNESCO has created an international forum for about 80 countries; through its Education Clearing House, it has published in French and English a survey of the educational systems of the world (1, 2, 3). Further publications in specific areas of education are planned.

The West European Union (or Union Europeene Occidentale as it is called in French) is another active organization in the education field. An outgrowth of the Brussels Treaty Organization, it originally consisted of the Benelux countries, France, and England, but in 1954 was joined by Germany and Italy. With headquarters in London, WEU is governed by a permanent council whose members are foreign ministers of the affiliated countries, or their ambassadors to Britain. The Union has a cultural committee which regularly schedules conferences and seminars in member countries. Here are the locations, dates, and topics of some of these conferences:

England—1949, 1952, 1953, 1957, 1959: "Foundations and Objectives of European Civilization" (4); "Introduction to the Methods of School Inspection and Instruction in the Schools of the United Kingdom"; "Apprentice Training in the United Kingdom"; and "Teaching of the Fine Arts, Music, and Literature."

Benelux Countries — 1951, 1955, 1956: "The Teaching of Geography—Curricula, Teaching Materials, and Teacher Education"; "Problems of School Buildings"; and "The Conference of West European Ministers of Culture and Education" (November 12, 1959, The Hague).

France—1950, 1959: "The Structure of the French Education System in Elementary, Secondary, and Technical Schools"; "Organization, Objectives,

* The author is currently associated with the German Department at Indiana University. His article on "Audiovisual Aids and Language Teaching in the USSR" appeared in the November-December 1960 issue of this journal.

and Methods of Teaching Through Correspondence"; and "Pedagogic Documentation and Information" arranged in 1958 by the Institut Pedagogique National. This conference, attended by 22 directors and staff members of European documentation centers, dealt especially with audiovisual materials. It resulted in further meetings at The Hague in 1958 and Bonn in 1959.

Italy—1958: "Conference on Vocational Training."

Germany—1957: "Conference for School Supervisors" where audiovisual instruction (including school broadcasts, tape recordings, educational motion pictures, slides, etc.) was discussed.

Besides WEU and UNESCO, a significant development occurred within the framework of the Council of Europe when in 1959 France invited representatives of the 16 signatory countries to UNESCO headquarters in Paris. Attended by 33 delegates, the conference was opened by UNESCO's director general, the French minister of education, and the French Ministry's director of the Department for Cooperation with Countries of the French Community and Foreign Countries. The opening speeches stressed the need for regional cooperation within the world-wide educational organization of the United Nations. After the conferees had studied problems in elementary, secondary, and technical education and means for achieving European cooperation, they voted to organize regular seminars and committees, including study tours to all types of schools in all countries. Recognizing the high cost of such a program, they voiced the hope that help would be forthcoming from the Council of Europe and the governments of signatory states.

In 1958 Sweden sponsored a seminar on the question of "The School Reform and the Comprehensive School." Other regional programs of educational cooperation are planned by the Scandinavian countries of Denmark, Sweden, Norway, and Iceland, all of which enjoy a common pattern of school organization and (excepting Iceland) similar languages.

These cooperative activities, aided by UNESCO, the Western European Union, and the Council of Europe, are a postwar phenomenon which can perhaps be attributed partly to the fact that in this same period European nations have become accustomed to collaborating in the education field in giving aid and guidance to the developing areas of Africa and Asia.

U.S. and AV Cooperation World-Wide

Audiovisual media and methods have increasingly been recognized as important essentials in the European cooperative programs, and it is in this sphere that the United States can make an important contribution in any joint effort to extend this cooperation throughout the world. Cooperation of documentation centers, including professional education associations, is becoming a necessity in our modern world. This cooperation might be stated in four long-range objectives:

1. Through the interchange of ideas and audiovisual materials, promote the improvement of educational methods and materials.

2. Through increased use of audiovisual materials, strengthen ideals of free democratic education.

3. Through direct teacher-to-teacher contact, including audiovisual personnel, strengthen international understanding and friendship.

4. Through long range participation,

establish an efficient international audiovisual organization.

The difficulties of attaining these objectives, foremost of which is the financial problem, are formidable.

International audiovisual pioneers such as Robert LeFranc of France and Edgar Dale of the United States have long worked for international cooperation. At a meeting with the DAVI international relations committee in Detroit in 1958, Monsieur LeFranc said: "There is need for a planning committee to avoid dangers of superficial treatment, overly optimistic treatment, unbalanced or unfair treatment . . . [of problems of international cooperation].

Dr. Dale has worked unceasingly for better international understanding and cooperation through his writings, especially his *Newsletter*. He has consistently emphasized the necessity for Americans to learn about their fellow citizens in other countries in what he calls the "tender-hearted" spirit of real friendship and understanding.

In this connection, permit me to make this simple generalization: I suggest that inasmuch as the European, including the European educator, is nowadays becoming Americanized (or perhaps it should be called technologically progressive), so should the American, including the American educator, become Europeanized.

Those who have worked and taught in other countries generally agree that the attitudes they first brought to their work had to change radically in order to achieve effectiveness. This is especially true if educational exchange is to succeed in the developing countries. Experience has shown that methods and materials developed as a result of research studies and cooperation are much more effective than are adaptations and transfers from an older cultural heritage to the new nation or culture.

One basic step toward an international audiovisual organization would be the establishment of a clearing house. UNESCO, ICEF, and the Centre Audio-Visuel in Paris have already established invaluable international contacts. Possibly this has also been done by some European, South American, and Japanese organizations. (My contribution here can only cover the European scene with which I have been closely associated during the past 12 years.)

Some of the actions a future DAVI international clearing house might take are:

1. Collection, correlation, comparison, and dissemination of international reports on research studies in the audiovisual field.

2. Evaluation of methodological and technical discussions and studies in the field of audiovisual education on the international level.

3. Collection, evaluation, and dissemination of instructional news on audiovisual activities, programs, personnel, and materials.

To do this I suggest:

1. The establishment of an operation with central files to maintain closer contacts with more and more organizations, institutions, and individuals in the fields of audiovisual production, utilization, research, administration, and information.

2. The establishment of secretariats (representatives) in Europe, Africa, Asia, South America, and Australia who could act as contributing correspondents and distributing agents (dissemination centers).

3. The establishment of multilingual translation programs. At the start, these

programs could at least prepare summaries of audiovisual information. The languages involved might be English, Russian, German, French, Arabic, Spanish, Hindi, and Chinese. The United Nations and the International Cooperation Administration (through its AV specialists overseas) have made a start in this direction.

I have reported some evidence of the will and aspiration of European nations to increase regional and international cooperation in the field of education. Others could report on general and specific international audiovisual activities such as the joint meeting of the University Film Producers Association and the Congress of International Schools of Cinema and Television which will take place this summer at Berkeley, California.

I have suggested objectives for international cooperation and programs to attain these objectives. Others have done so too—within and outside the framework of DAVI. As a final point, I wish to state my opinion that the Department of Audiovisual Instruction, with the U. S. Office of Education and other organizations such as UNESCO, WEU, ICEF, and the Council of Europe, is in an excellent position to assume leadership in a worldwide program of audiovisual exchange.

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A COMMON LANGUAGE NONETHELESS

The Silent Language, by Edward T. Hall (New York: Doubleday and Company, 1959. 240 p. $3.95).

THE BEST WAY TO APPROACH this important book is by way of the statement on page 79:

> Today man has developed extensions for practically everything he used to do with his body. . . . Clothes and houses are extensions of man's biological temperature-control mechanisms. Furniture takes the place of squatting and sitting on the ground. Power tools, glasses, TV, telephones and books which carry the voice across both time and space are examples of material extensions. Money is a way of extending and storing labor. Our transportation networks now do what we used to do with our feet and backs. In fact, all man-made material things can be treated as extensions of what man once did with his body or some specialized part of his body.

These are thoughts which would have been easily acceptable in the fifth century B.C. at Athens. They are thoughts of organic wholeness and of the simultaneous interplay among all the components in a field. What have we been doing for 2500 years that renders such thought novel or even strange? Professor Hall is an anthropologist. Where did anthropology acquire these models for research? What happens to our specialist and segmented world of subjects and categories when anthropological models are mounted to observe and interrelate what we have so long ignored and partitioned in our actions and awareness? The answer is in the single word *communication* which signifies participation in common or shared awareness.

In considering our entire world of artifacts and institutions from vernaculars to paper cartons as the externalization of inner motive and need, Professor Hall simply states and sustains the proposition that these externalizations, however separate and distinct, speak yet a common language which can be learned even by the occupants of the Tower of Babel. The practical program implicit in *The Silent Language* is that there can be a *consensus* for all the separate senses and faculties which we are endlessly externalizing. We can learn how to translate all the diverse, external manifestations of our inner lives into a coherent statement of human motive and existence.

A similar practical program for construing the diverse non-verbal gestures of the human family into a common tongue is to be found in the poetry and painting of the past century, as became explicit in the Bauhaus program. Personally I have been associated with people from all of these groups in approaching the problem of the Languages of the Media of Communication. For the

media, as externalizations of this or that group of senses, began with speech which is an externalization of all of our senses at once, in infinitely varying ratios. The subsequent technical media from alphabet to TV are specialist separations of the senses pushed to high intensity. The social and psychological results were and continue to be drastic.

There is very little direct concern with media as shapers of culture in *The Silent Language*. But there is great and specific knowledge of the *effects* of media in setting the assumptions of cultures. As Hall says at the outset in citing growing government concern with the linguistic training of its staffs abroad:

> Of equal importance is an introduction to the non-verbal language which exists in every country of the world and among the various groups within each country. Most Americans are only dimly aware of this silent language even though they use it every day. . . . In addition to what we say with our verbal language we are constantly communicating our real feelings in our silent language—the language of behavior.

The entire Western world acquired a set of non-verbal attitudes from the phonetic alphabet which translated the ear-world of tribal man into the eye-world of the separate citizen. In terms of our sense structures and attitudes, the West got all of its Euclidian space as a silent, non-verbal derivative of the alphabet. Hall is vividly aware of the preliterate attitudes to time and space. He is not aware that our Western non-auditory and non-oral attitudes to time and space derive solely from the medium of the phonetic alphabet. The act of massive translation of all sensible experience from dominant auditory to dominant visual terms by means of the alphabet was the most decisive technological event in human culture prior to the electronic revolution. But with the electronic do we not again exist as global yokels in a global village? Are we not translating our Western visual discreteness back into the buzzing monism of auditory space? Also, having driven our senses out of ourselves by technological extension, do we not lack entirely a *consensus?* I do not think that the goals set by Hall can be approached without due awareness of the silent languages of the media from alphabet to TV. The silent non-verbal languages of the media cut across all the cultural "sets" with which Hall is concerned. But his entire work is relevant and essential to those of us engaged in trying to understand media.

—MARSHALL MCLUHAN
University of Toronto

FLAWS IN AV CONTENT

Audio-Visual Techniques in Teaching Foreign Languages, by Theodore Huebener (New York: New York University Press, 1960. 163 p. $3.25).

WITH THE INCREASING AVAILABILITY of audiovisual materials and equipment for foreign language teachers—particularly through the beneficence of Title III of NDEA—it is urgent that these media be used effectively. It is for purposes of answering the questions about effective use that this small book (163 pages) has been added to the limited number of major publications concerned with audiovisual materials in foreign language teaching.

The main usefulness of this book will be found in its illustrative lessons and in its sources for and titles of records, tapes, slides, filmstrips, motion pictures, pictures and prints, and in its bibliography relating to utilization of audiovisual media in a variety of foreign

languages. Its shortcomings are most apparent from the standpoint of fulfilling its stated purpose.

In the first chapter, after a brief historical background, there is a standard list of what audiovisual aids can do if properly used. The grouping of materials under "visual" and "auditory" in this chapter and the next is less complete and without the adequate philosophical framework found in most standard audiovisual texts.

In Chapter 2, sections are devoted to Types of Materials, the Blackboard, Dramatization, and Flat Materials. Chapters 3 through 7 deal with Audial Materials and Techniques, The Tape Recorder, Audio-Visual Techniques and Classical Languages, Television, and The Foreign Language Laboratory.

Occasionally one finds categoric statements that certain techniques or materials should be used, with no documentation to substantiate the validity of the suggestions. The book also contains several instances of a lack of precision. For example, there is included on page 4 a listing of Projected Materials which includes "*films*, filmstrips, *motion pictures*, television." One must ask, what is the difference between "films" and "motion pictures"? On page 45, one may ask the same question of the statement, ". . . the filmstrip has decided advantages . . . over the ordinary *film* and even over the *motion picture*" (italics mine). One wonders further why the author failed to suggest the use of the opaque projector for purposes of copying maps and outline drawings when a later section does discuss some advantages of the opaque projector.

In a section on slides, very limited reference is made to 2x2 slides and no reference is made to the potentials of the 35mm camera for slide production nor to the usefulness of Polaroid slides. The discussions of the flannelboard and magneboard are inadequate.

An example of a misleading explanation concerns the operation of the tape recorder. One statement claims the "safety button" position is *up* for recording and another statement, two paragraphs later, claims, "when the safety button is *depressed*, the machine is ready to record." Some of the nomenclature in the explanation does not coincide with the tape recorder diagram and the captions for the diagrams of the tape recorder and the 16mm motion picture projector are reversed. Errors are also apparent in the diagrams for the 16mm projector and the 35mm filmstrip projector. The extra crossing of the lines which represent the path of light through the projection system in each case would result in an inverted image on the screen!

This reviewer feels that the inaccuracies and incompleteness of the audiovisual content of this book will detract from the fulfillment of stated objectives.

—G. M. TORKELSON
The Pennsylvania State University

SANS FANFARE

Instructional Materials: An Introduction for Teachers, by Louis Shores (New York: The Ronald Press Company, 1960. 408 p. $6.50).

WE NOW HAVE A BOOK treating audiovisual materials which should not antagonize the Joseph Wood Krutches among us. Mr. Krutch has bemoaned the excessive attention given to audiovisual aids because he fears we may be raising a generation of illiterates. Dean Shores of the Library School of Florida

State University begins his preface with the following sentence: "This book has been written as an introductory textbook for prospective teachers. . . ." His first sentence of Part I, "The World of Print," is "First among teaching tools is the textbook."

We need this comprehensive and integrated approach to printed, graphic, and projected materials. One feels that because Dean Shores has something to say in this area, he has not needed to say it elaborately. Money and labor have not been spent to make this a most attractive book. Indeed, his book looks like a book—a refreshing antidote for some flamboyant revisions of works that strain for supremacy in a competitive market by way of abundant color, huge pictures, tipped-in transparencies, teacher and student manuals, and sizes and shapes that are unwieldy on an ordinary sized book shelf. Also it is refreshing to have a book by a man rather than a team. The book has the character and integration one finds in a single man's work.

Within this single, modest volume the prospective teacher may learn a lot, and he will have a book that is sufficiently inexpensive, so that his copy may end up in his library rather than the used textbooks shop. After presenting the "Worlds of Print, Graphics, and Sight and Sound," Dean Shores closes his book with a section on "The Teacher and the Materials Center," a "List of Tools Cited," and name and subject indices.

The book can be useful as a text for students who need to get an introduction to *all* the materials they may use to deepen and extend learning.

—ROBERT STEELE

Boston University

SEMANTICAL PATTERNS

Communication Patterns and Incidents, by William V. Haney (Chicago: Richard D. Irwin, Inc., 1960. 321 p. $7.20).

ALL AUDIOVISUAL EDUCATORS should be familiar with general semantics because general semantics is concerned with failures in verbal communication. Dr. Haney explains briefly some of these failures and illustrates them liberally with "incidents." As evidence of the close relationship of the two fields of study, some of the anecdotes will be instantly familiar to AV educators, such as the drawings of the Aardvark and the story of the plumber who used hydrochloric acid.

Almost a dozen chapters are given to explaining and illustrating patterns of miscommunication such as the inference-observation confusion, by-passing, allness, and variations of differentiation failures and intensional orientation. For the beginner there may not be enough explication of the "patterns." For example, the author describes too briefly the "one meaning" error and the fact that words do not "contain meanings."

Dr. Haney's work is in business administration, and many but not most of the incidents with which the book is loaded are from the field of business. Not all refer to difficulties with language, since general semantics is broadly defined by Wendell Johnson as "the systematic attempt to formulate the general method of science so it can be applied generally to daily life."

Useful by-products of the volume are the references and the extensive bibliography. The beginner will be introduced to Benjamin Lee Whorf, Alfred Korzybski, S. I. Hayakawa, Wendell

Johnson, and Irving J. Lee, and will see the applications of general semantics to many fields, including education.

—PAUL R. WENDT
Southern Illinois University

JAPANESE SURVEY

Japanese Popular Culture: Studies in Mass Communication and Cultural Change, edited by Hidetoshi Kato (Tokyo and Rutland, Vermont: Charles E. Tuttle Co., 1960. 233 p., $4.75).

THE FIFTEEN ESSAYS in this book were written by ten Japanese specialists in mass communication and mass culture, members of a research institution known as the Institute of Science of Thought. Hidetoshi Kato's Introduction deals with the development of communication studies in Japan. In another essay the same author examines the content of counseling space and time in newspapers, magazines, and broadcasting. Kenichi Adachi's essay analyzes the image of America in contemporary Japanese popular fiction. Taihei Imamura compares the content of American and Japanese comic strips. Kanji Hatano's essay discusses the content of Japanese comics from an educational point of view. Certain cultural aspects of a particular kind of popular entertainment, called "The Girls' Opera," are examined in Mamoru Mochizuki's essay.

The book also includes four studies of movie content. Hiroshi Minami's study examines the structure of the audience and the movie market and also discusses the effect of movies. Taihei Imamura studies the so-called "Japanese Spirit" as expressed in movies from an aesthetic point of view. Tsutomu Ono's essay analyzes the cultural attributes of one of the most popular postwar movies, "Kimi no Na wa" ("What is Your Name?").

Hiroshi Minami writes on the content analysis of postwar Japanese popular songs. And Shunsuke Tsurumi analyzes the Japanese way of thinking in a special relation to the language problem. Finally, the book includes in the Appendix basic statistics on Japanese communications, literacy rates, and mass media audiences. Unfortunately, the latest figures are based on the 1955 statistics.

Some of the essays are worthy of special mention. Mr. Adachi's article on the "Image of America" reveals that American individuals as described in Japanese fiction are likely to be seen as "good - natured," "individualistic," "sociable," adventurous," and "aggressive," while they are also likely to be "ignorant," "careless," "sensual," and "dishonest." American culture as a whole is rated in popular fiction as *good* because of its "advanced scientific techniques and respect for women," and as *bad* because of its "lacking tradition" and "having respect for women." Negroes are always described favorably in Japanese popular fiction.

Dr. Minami's surveys on movies and popular songs reveal that certain traditional values in Japan, such as pessimism and fatalism, are still dominant ingredients of commercial success. Mr. Imamura's content analysis of Japanese movies found that the so-called "Japanese Spirit" manifested in movies emphasizes nature rather than the human psyche or society at large. Techniques of movie production in Japan are thus affected by the traditional Japanese mode. As the author writes: "Society is . . . observed only through nature, and the director's thinking about society

is symbolically simplified by natural scenes."

Mr. Tsurumi's essay traces the history of the development of three classes of Japanese language: the language of science, fiction, and vaudeville. He argues that these three correspond with particular ways of thinking which are in turn related to class stratification in Japan. The first two classes of language, those of science and fiction, have developed to serve the upper-status groups of society, whereas the language of vaudeville is a vehicle of expression for undercurrents among the common people. Tsurumi points out the sociological implications of a language of science which, mainly consisting of imported foreign words and phrases and written in difficult Chinese ideographs, creates an "ivory-tower" superiority.

Certain biases of this book are revealed by the editor, Mr. Kato, in his Introduction. He writes that "[Japanese scholars] are aware of the fact that in such a country as Japan, where social structure is more complicated than in the United States, techniques used in America will not always reveal facts of Japanese society. To obtain material on hidden emotions of the people, for example, intensive qualitative study is a better technique."

In summarizing the development of communications studies in Japan, Mr. Kato appears to limit his review to the relatively narrow reach of his own interests. When the present book was published in English, at least two major works had been published in Japan in the areas of mass communication. One is the *Lecture Series on Mass Communications* (in Japanese) by the Kawade Publishing Co., Tokyo. The series was the result of two years of collaboration by more than 60 specialists in political science, economics, philosophy, history, education, and the mass media. The other is the publication of a special number of the *Shiso* monthly on television by the Iwanami Publishing Co., Tokyo, in November 1958. Again, it was the result of cooperation by 24 social scientists and mass media specialists. Both of these were omitted in Mr. Kato's review.

Despite these biases, however, this book is a good guide to certain aspects of the Japanese intellectual climate, communication research, and Japanese culture in transition.

—YASUMASA TANAKA
University of Illinois

PREVIEW OF TOMORROW

Schools of Tomorrow—Today! by Arthur D. Morse (New York: Doubleday and Company, 1960. 191 p. $1.50).

"THE NEXT DECADE will see more changes made in education than have occurred in the past 50 years. This will include results of the instructional revolution, new patterns of organization, and better patterns of administration and the considerable application of technology to the instructional process."

This prediction is supported by Arthur Morse in this book. In a brief 191 pages, he describes ten representative experiments in eight states as follows:

- *Team Teaching in Action:* The Franklin School of Lexington, Massachusetts
- *Schools Without Grades:* The Elementary Schools of Appleton, Wisconsin
- *The Search for Hidden Talent:* New York City's Demonstration Guidance Project

- *Freeing the Teacher for Teaching:* The Teacher Aides of Bay City, Michigan
- *Television Pioneer:* Washington County, Maryland
- *Experiments in Excellence:* Evanston (Illinois) Township High School
- *Experiments in Excellence:* Golden (Colorado) High School
- *Breaking the Rural Barrier:* The Catskill Project
- *The Electronic Link:* Television in Southwestern Indiana
- *Teachers of Tomorrow:* The Harvard Program

The book is written in a non-technical style although statistics are presented to give the reader precise information concerning the findings.

Each experiment is introduced by a statement of the problem for which the experiment attempts to find a solution. For example:

"There are 8,100,000 high school students in the United States. It is estimated that in ten years this number will rise to 11,664,000. How do the high schools propose to meet the challenge of quality and quantity?

"Our secondary schools have not been adventurous. They have often failed to exploit the potential of their students. The era of outer space has caused a great threshing-about in science, but few high schools have examined their total programs critically.

"Evanston (Illinois) Township High School and Golden (Colorado) High School represent a growing number of secondary schools which are experimenting in their organization and curriculum to meet the challenge of a new decade."

This is the introduction to the two experiments on variable class-size grouping and utilization of the secondary school staff.

An appendix provides a short resumé of nine additional related experimental programs. Also given are the names of persons who might be contacted for more information about each program.

In addition to acquainting the educator with a quick reference to various ways in which newer media are being applied to education, reports such as this will help keep a sharp focus on issues and problems confronting education, and to assess the progress made toward their solutions.

—W. DONALD BRUMBAUGH

University of Utah

WITH BUILT-IN TV

Design for ETV: Planning for Schools with Television. Prepared by Dave Chapman, Inc., Industrial Design. (New York: Educational Facilities Laboratories, 1960. 96 p.)

CHALLENGED TO HELP INFLUENCE the planning of future school facilities, Dave Chapman, Inc., Industrial Design, undertook the writing of *Design for ETV* for the Educational Facilities Laboratories. Utilizing a distinctive verbal and visual sketch form, the authors offer comments, recommendations, and suggestions to guide those planning new schools or adapting existing buildings. Although particular emphasis is placed on the effective planning and use of television in the classroom, the report also includes significant thoughts about the dignity of teaching, the teacher-learner environment, and economies possible with new student-teacher ratios and ingeneous multiple use of school facilities.

Before coming up with guidelines for planning school facilities, this design team undertook a diagnosis of the basic elements in the complicated education equation. The resulting first section of this report, "Elements that Effect Our Educational Program," provides the

school administrator with current data and projected future statistics about American students, teachers, and teacher-student-space relationships. Armed with these, any administrator should be able to convince his community that both the procedures and the facilities of education must be re-evaluated in the light of current and future demands.

The key idea advanced by the authors is that while a certain amount of flexibility can be built into architectural plans to meet future changes, the larger responsibility falls upon the educators since a creative educational program must precede creative design of any school facility.

The second section deals with suggestions on how to start planning schools for utilization of television. Various types of origination, transmission, and reception equipment are discussed. Also treated are basic diagrams of ETV systems for individual schools, schools linked by CCTV facilities, and schools linked by open-circuit facilities.

The section on "Seeing, Hearing and Learning" gives specific recommendations concerning maximum and minimum viewing distances, horizontal viewing angles, standards of legibility and pupil-equipment ratios both for television and other audiovisual media. With high praise for the majority of the report, the reviewer cannot but question certain aspects of this section. One area of concern deals with the number of acceptable viewing stations for television sets of varying sizes. For instance, a television set having a 24-inch tube is reported as capable of providing an adequate projected image within an average viewing area of 325 square feet when acceptable viewing distances and viewing angles are maintained. In spite of acknowledging that teacher and pupil ingress and egress, and that educational requirements and building and fire codes should be considered, the report suggests this viewing area will accommodate from 64 to 72 students. A quick calculation reveals that for 72 students there would be less than 4.5 square feet per student if even the barest of aisle space was provided. With the suggested three-foot spacing between rows, each student would have only one and a half feet allotted for body width and arm movement. A student's sudden urge to leave the room might cause major problems under such conditions!

A second question relating to the suggested desirable seating areas seems worthy of consideration. As noted by the authors, it is common practice to use television as a transmission medium for visuals such as educational motion pictures and filmstrips produced originally for classroom use. Obviously charts, graphs, sketches, and captions included in such material and designed for 6W standards will not be legible for students seated at maximum viewing distances figured on the television 12W standard. Therefore, it would seem imperative that school builders taking guidance from this report be at least cautioned that when and if visuals produced primarily for classroom use are to be transmitted via television, a seating arrangement calculated on six to eight widths rather than 12 widths of the television screen be considered.

Treatment of environmental factors such as acoustics, lighting, ventilation, and color is handled so skillfully that one gladly reviews the familiar, if unexciting, standards of footcandles, decibels, and reflectance factors to get to some of the suggested innovations—

non-rectangular room shapes, classroom carpeting, sound-blocking space dividers, and pupil study carrells.

In visualizing group space arrangements within the school of tomorrow, the authors hit their stride and demonstrate that they are, in truth, specialists in creative design. Keeping within their original premise that "the design of a school, its spaces and its facilities must permit and support the educational function," they provide sketches which surely will spark the imagination of even the most conventional school builder.

Starting simply with suggestions for large group spaces—two conventional classrooms divided by a folding room divider—they run the gamut of flexible space design to a hexagon building housing six classrooms clustered around a central audiovisual resource area with rear-screen projection from the central location.

Finally, the list of references, bibliographic notes, TV equipment estimates, and answers to the most frequent questions asked of the design team complete a report destined to become one of the most significant contributions to efficiency of design in tomorrow's schools.

—JOHN MOLDSTAD
Indiana University

NOTES AND COMMENT

"SCHOOLS ARE SLAUGHTERHOUSES of the mind where ten or more years are spent on learning what might be acquired in one . . . places where minds are fed on words." These fighting words of Comenius open the editors' introduction of the twenty-second issue of the *Year Book of Education* (Tarrytown-on-Hudson, N.Y.: World Book Co., 1960. 592 p.), the eighth under the joint sponsorship of the University of London Institute of Education and Teachers College, Columbia University. The 1960 *Yearbook* is devoted to "Communication Media and the School." Joint editors are George F. Z. Bereday of Teachers College, and Joseph A. Lauwerys of the University of London. This 592-page book is a world-wide compendium of theory, research, and practice in the broad fields encompassed in its title. It is perhaps the year's required acquisition for reading and for reference on the shelves of AVCR readers.

The size, scope, and complexity of coverage defeat attempts at reviewing or even characterizing this book as a whole. Its 49 chapters and five substantial editorial introductions (all happily indexed), come from more than a dozen countries on all continents. Contributors include such names known to AVCR readers as Colin Cherry, Harry J. Skornia, Hilde T. Himmelweit, Kenneth D. Norberg, Hideya Kumata, Malcolm S. MacLean Jr., and many others who might be known but for our ethnocentric provincialism. The four sections of the book deal with "New Media and Education—Theoretical and Social Implications," "Developments: Inventions and Research," "Area Studies," and "Case Studies."

From time to time, this department will endeavor to call attention to certain

specialized contributions included in this volume. In the meantime, the riches are there for readers to mine for themselves.

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To provide an exchange of ideas that will assist television stations in planning and production of local public affairs programs, the Television Information Office (666 Fifth Avenue, New York 19) has published *Interaction,* by Robert Lewis Shayon, which supplies examples of such programs as broadcast in 162 cities throughout the U.S.

On the assumption that many stations could adapt other stations' programs and ideas to their own community needs, this unique sampling—the first systematic effort of its kind carried out on so large a scale—describes more than 1000 programs and program series broadcast by 264 television stations between January 1959 and June 1960.

Interaction contains 15 chapters, each devoted to one category of public affairs programming: Community Affairs and Problems; Literature and the Arts; For Better Schools; Science and Technology; Children and Youth; Government and Politics; Safety and Law Enforcement; Religion; Farm and Conservation; Health and Social Problems; Formal Education; Organizations, Activities, and Services; Practical Arts and Skills; General Adult Education; and a special category—Exploring New Program Areas.

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The Scientific Research Institute of the Methods of Teaching is one of eight research institutes of the Academy of Pedagogical Sciences, top scientific body of Russian education. Its Visual Aids section carries on research concerned with teaching specific subjects, and tests its methods and materials in specially designated experimental schools. One of its responsibilities is the design of school furniture and equipment. These and other interesting facts and observations can be found in an informative current volume about Soviet education, *The Changing Soviet School; The Comparative Education Society Field Study in the U.S.S.R.*, edited by George F. Z. Bereday, William W. Brickman, and Gerald H. Read (Boston: Houghton Mifflin Co., 1960).

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If you had to give up using all mass media except one, which one would you choose? The winning answer to this question, almost as tricky as asking people to choose between eating and drinking, is, of course, "television." "Television's Value to the American Family Member," by Reuben Mehling in the Fall 1960 *Journal of Broadcasting,* also gives the *reasons* for such forced media choices. "Entertainment" is the chief appeal of most media including books but excepting newspapers, whose entertainment values less than one in ten readers recognize. However, only about the same number consider newspapers "more informative" than other media, while twice that many magazine choosers and three times that many book choosers claim that their medium is "more informative." The same issue of the *Journal* contains a comprehensive "Bibliography of Studies of Radio and Television Program Content, 1928-1958" by Francis E. Barcus.

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Those who are fascinated by the audiovisual theories of Marshall Mc-

Luhan (see his review of *The Silent Language*, above) would do well to read his "Myth and Mass Media" in *Myth and Mythmaking*, edited by Henry A. Murray (New York: George Braziller, 1960). He advises educators to do "what poets, painters, and composers have done, namely, to purge our media and test and define their unique powers before attempting Wagnerian concerts."

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In the Fall 1960 issue of *Journal of Communication* Theodore Clevenger, Jr., University of Wisconsin, describes "Some Characteristics of the Study of Communication in 1960." These characteristics, as Clevenger sees them, are ambiguity, fragmentation, "formal-holism," methodological rather than substantive orientation, and great proliferation of theory. In a brief rejoinder John B. Haney, U. S. Air Force Academy, suggests that "communication" as a process central to a great variety of activities is a *general* rather than an ambiguous concept, and that its "fragmentation" is an essential aspect rather than a fault. *The Journal of Communication* is published by The National Society for the Study of Communication.

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The road from the principles of "programmed learning" to technological implementation is no more simple and direct than was the road from the principles of internal combustion to the automobile. Such roads lead to profound changes and consequences which far transcend the intentions of innovators. Technological change means social change, not mere increase in "effectiveness." Communication technology concerned with "effectiveness" alone often overlooks the most significant consequences of its own making. The introduction of "machines" for instruction—or for anything else—requires the industrialization of a new area of life. It affects the process of decision-making in society. One of the best recent discussions of some of these effects is C. B. Macpherson's Introduction to a recent issue of UNESCO's *International Social Journal* (Vol. XII, No. 3, 1960) devoted to "Technical Change and Political Decision."

The subsequent issue of the same *Journal* (Vol. XII, No. 4, 1960) tackles "Sociological Aspects of Leisure" around the world. Among articles of special interest to students of communication and education are "Leisure and Technological Civilization" by Georges Friedmann, and "Popular Culture: A Humanistic and Sociological Concept," by Leo Lowenthal. Parts II and III of the *Journal* are customarily devoted to summaries of research activities in numerous countries, annotated lists of documents and publications by the UN and specialized agencies, book reviews, and news and announcements of international conferences. —G.G.

■ RADIO

Adkins, Gale R.

A Study of Certain Factors that Influence the Use of Radio Broadcasts and Recordings in Public School Classrooms. Radio-Television Research. Lawrence: The University of Kansas, 1959. 33 p.

Purpose: To investigate the availability of certain items of audio equipment, teacher preferences regarding classroom use of radio broadcasts, tape and disc recordings, and the difficulties experienced in the use of radio in the classroom.

Procedure: The study was conducted as a survey with a postcard questionnaire as the chief data-gathering instrument. Two forms of the postcard questionnaire were constructed: one was distributed in teachers' meetings or placed in faculty mail boxes; the other was a double postcard which included the single card for return plus an attached card bearing a brief explanation of the study. Both forms carried the questions and allowed space for the answers, but no respondent's signature was required. A total of 2420 postcard questionnaires were distributed to Texas public school teachers of grades 1 through 9. The teachers represented all cities with populations of 50,000 or over, plus selected smaller towns. Cities served by radio or television stations were not represented in the sample.

Results: A total of 1419 usable postcard questionnaires were returned. (This was considered a good return for a questionnaire with no follow-up contact.) The survey revealed that: (1) 80 percent of the sample group could be reached either by radio broadcast or by recordings of radio broadcasts, (2) the majority of respondents favored recordings over radio for classroom use, (3) inconvenience of broadcast time and inability to preview, stop and resume, or re-run broadcasts was the chief difficulty in using radio broadcasts as instructional materials, (4) approximately 75 percent of the reported difficulties were related to the medium and its use rather than to the content and nature of programs. —*H. H. McAshan*

■ TELEVISION

Westley, Bruce H., and Mobius, Joseph B.

The Effects of "Eye-Contact" in Televised Instruction. Research Bulletin No. 14. Madison: University of Wisconsin Television Laboratory, 1960. 40 p.

Purpose: To determine in a television setting whether high eye-contact between the speaker and his audience should be associated with (1) greater attention, (2)

greater interest, (3) greater information gain, and (4) certain changes in the "meaning" of the speaker and his subject matter as measured by the Semantic Differential.

Procedure: Three eight-minute speeches were prepared from alien subject matter, with each speech of nearly equal difficulty. Nine videotaped sequences were prepared, each speech recorded under three eye-contact conditions: *high* eye-contact condition where the speaker looked directly into the "take" lens of the camera at least 90 percent of the time; and *medium* and *low* contact conditions where the speaker looked into the "take" lens 50 and 10 percent of the time respectively. A simple one-camera show was produced with few camera dynamics and no visuals. Fifty-one residents of a women's dormitory served as paid subjects. On three successive nights, one-third of the group reported to the studio, viewed three lectures in the same order, and were instructed not to communicate with one another until the completion of the experiment. The sample subjects were assigned randomly to the three treatments. *Attention* was measured by pictures taken at one-minute intervals during the viewing periods. *Interest* was measured by a simplified sequential audience analyzer consisting of a seven-point scale ranging from "highly interesting" to "highly uninteresting." *Information gain* was measured by means of a 12-item four-place multiple choice test of facts drawn from the content of each of the programs.

Results: None of the tests administered resulted in any significant differences which could be attributed to the eye-contact manipulation. As a result of these findings, legitimate doubt may be placed upon the validity of the assumptions adopted by advocates of the eye-contact hypothesis. —*H. H. McAshan*

■ TEACHER TRAINING

Logan, Edwin M.

A Survey of Introductory Audio-Visual Laboratory Programs in Selected Colleges and Universities. Doctor's thesis. Charlottesville: University of Virginia, August 1958. 352 p.

Purpose: To determine the laboratory activities provided and the various practices followed in introductory audiovisual laboratory programs of selected institutions of higher learning throughout the United States.

Procedure: After examining numerous printed materials and contacting various resource persons, the writer devised a questionnaire and sent copies to 193 colleges and universities recommended by state audiovisual directors or their counterparts. Of these institutions, 184 (or more than 95 percent) completed the questionnaires.

Results: Various general practices prevailed in the laboratory programs studied. The introductory audiovisual course was usually a combination of both laboratory and lecture. Most institutions had a room, separate from the classroom, equipped for laboratory work. While no particular pattern emerged in answer to the self-appraisal questions, a slight majority of colleges and universities considered their facilities, including darkroom, storeroom, equipment, materials, space, and acoustics as partially adequate. Although it was revealed that the time allotted to laboratory work varied, between one and two hours per week was the general rule.

Laboratory work was usually pursued during the junior, senior, or graduate years with slight preference for the junior year. Laboratory classes were comprised mainly of education students. Though group sizes for work on the laboratory exercises varied, they usually ranged from one to five members. Nearly two-thirds of the institutions provided laboratory exercise guides in some written or printed form; the remaining schools furnished none. The average laboratory program presented experiences involving 26 different exercises among which were ten on

equipment, nine on production, four on evaluation, one on photography, one on duplication of materials, and one of a miscellaneous nature such as the field trip.

The importance of each introductory audiovisual laboratory exercise was also judged by the instructors participating in this study. Among the exercises considered most valuable, in the order named, were those involving the (1) 16mm sound motion picture projector, (2) filmstrip projector, (3) evaluation of films, (4) tape recorder, (5) 2x2 slide projector, (6) evaluation of filmstrips, (7) opaque projector, (8) field trip, (9) bulletin board, (10) evaluation of free materials, (11) preparation of materials for opaque projection, and (12) evaluation of recordings.

Other exercises considered important, in descending order of their value, were those involving the (1) overhead transparency projector, (2) feltboard, (3) record player, (4) exhibits and displays, (5) picture mounting, (6) transparency preparation, (7) 3¼x4 standard slide projector, (8) evaluation of radio programs, (9) charts and graphs, (10) poster making, (11) handmade slides, (12) television, (13) lettering, and (14) radio.

The study further determined that students were taught to use from one to three different equipment models. Some aspects common to all types of equipment were also taught, among them, operation and utilization, nomenclature and function of basic parts, simple care and maintenance, criteria for selection, names and addresses of manufacturers, and costs of equipment.

Various laboratory instructional practices were discovered and critically examined. Findings indicated that a high degree of student performance was always required; however, many institutions did not always afford students an opportunity to utilize aids in instructional situations. Moreover, written instructions for exercises were not provided in numerous instances, nor was an appraisal generally made of the students' work. The survey evoked a number of suggestions from laboratory directors for improving the program. These comments pertained to administrative aspects, organization, content and scope, instructional practices, and other related aspects.

On the basis of the findings of this study and the best judgment of the writer as to what would constitute an adequate audiovisual laboratory program at the college level, a program of introductory laboratory exercises was recommended, including suggestions as to what general and instructional practices are considered most desirable. *—E. M. Logan*

■ VISUAL AIDS

Simon, Richard M.

Visual Aids and Their Use in the Muncie and Delaware County Industrial Education Programs. Bloomington: Indiana University, August 1960. 36 p.

Purpose: To study the availability and extent of use of various visual teaching aids in a typical industrial education program.

Procedure: Thirty-eight questionnaires were sent to industrial education teachers at Muncie in Delaware County. Muncie was selected for the study in view of its role as a typical American community. The results were based on 22 returns.

Results: Individual demonstrations, motion pictures, models, and field trips far exceeded all other forms of visual aids in their availability and use. Half of the shops did not have exhibit or display cases. Chalkboards and bulletin boards were plentiful. *—L. Twyford*

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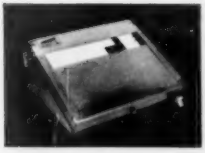

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